Robert R. Marriam, Consultant
Remedium Group, Inc.
A Subsidiary of W. R. Grace & Co.

6401 Poplar Ave., Suite 301
Memphis, TN 38119

Tel: (901) 820-2023
Fax: (901) 820-2061

Remedium

December 13, 2007

Ms. Bonita Lavelle
US EPA Region 8
EPR - SR
1595 Wynkoop Street
Denver, CO 80202-1129

Dear Bonnie,

We have searched our records for information concerning the "Glory Hole" at the former Grace vermiculite mine near Libby, MT. According to information supplied in correspondence from Alan Stringer (former general manager at Libby), the "Glory Hole" was a hole approximately one acre in size and about 25' – 35' deep. When the mining and mill facilities were demolished (1991 – 1992), the construction debris was placed in this open hole, evidently with the approval of Montana DEQ. After completion of the demolition of the plant and placement of debris in the hole, the area was covered with soil.

Most of the existing correspondence relates to the trenches dug in 2000 to examine the construction debris placed in the Glory Hole. This was done at the request of US EPA in 2000 and 2001. Installation of a monitoring well (MW-1) and analysis of the water samples from the water well are also included herein.

Please advise if there are any questions.

Robert R. Marriam

Cc: Catherine LeCours, Montana DEQ
W. M. Corcoran (w/out attachments)
R. J. Medler (w/out attachments)

dwp
Enclosures

GRACE

W.R. Grace & Co.
317 Mineral Ave.
P.O. Box 695
Libby,Mt. 59923

Tel: 406 293 3964
Fax: 406 293 3749

Patrick Plantenberg
Montana Dept. of Environmental Quality
P.O. Box 200901
Helena, Montana 59620-0901

August 8, 2000

Pat:

I received your inspection report from the June 8 and July 7 trips to the mine and I understand all of the action items. I have a few questions but will address them in another letter. The purpose of this letter is to let you know that Grace and the EPA have worked out an access agreement covering the mine site investigation. Therefore it is not our intent to establish any air-monitoring plan for the mine. The EPA had already started an air-monitoring program and we intend to accept the data from their testing.

If you have any questions or concerns please give me a call.

Alan Stringer

DEQ_88

GRACE

W.R. Grace & Co.
317 Mineral Ave.
P.O. Box 695
Libby,Mt. 59923

Tel: 406 293 3964
Fax: 406 293 3749

4144-4960

Patrick Plantenberg
Montana Dept. of Environmental Quality
P.O. Box 200901
Helena, Montana 59620-0901

August 23, 2000

Pat:

This is to confirm our conversation of August 22, 2000. As you know the most recent DEQ inspection report set a number of deadlines for completing certain work at the mine site. Due to a number of logistic issues, including manpower shortages related to the number of forest fires currently burning on the Kootenai, we are unable to meet the September 1, 2000 deadlines. You have given us until September 15, 2000.

We intend to begin the excavation of the Glory Hole on Tuesday September 5, 2000. The uncovering of a portion of the buried material should take no more than 3 or 4 days. We will contact your office when we have uncovered sufficient material for an inspection.

In discussion with Joe Guerrie, of your office, we will be required to drill one groundwater monitoring hole at the Glory Hole and one at the waste dump to a depth where water is first encountered, regardless of depth. Both of these holes should be cased and capped.

If there are some concerns or corrections to what I have laid out please give me a call as soon as possible.

Alan Stringer

DEQ_823

GRACE

W.R. Grace & Co.
317 Mineral Ave.
P.O. Box 695
Libby,Mt. 59923

Tel: 406 293 3964
Fax: 406 293 3749

Patrick Plantenberg
Montana Dept. of Environmental Quality
P.O. Box 200901
Helena, Montana 59620-0901

August 25, 2000

Pat,

I have attached a map of the Glory Hole area indicating the areas where we propose to excavate for an inspection, by the EPA and the DEQ, of what was put into the hole during the mine closure of 1990 to 1993. I have delineated two areas, one on the Southeast corner and one on the East end.

In a discussion with John Constan it was decided not to excavate the North side, as this was the area where the debris from the lower waste dump was deposited. The DEQ is fully aware of what that material consisted of and it serves no purpose to uncover it.

The total area of the Glory Hole is just under one acre. The two excavations are approximately 3,500 sq. ft. each. The depth of the Glory Hole is between 35 feet and 40 feet. We will excavate to a depth sufficient to allow a complete view of what was deposited at that location. The dirt covering the material will be stockpiled separate from any debris. Any debris that is excavated will be stockpiled adjacent to the Glory Hole.

I have also indicated on the attached map an estimated location of where we will drill the groundwater-monitoring hole. Although I have asked the surveyors working on the Course Tails pile to establish a Global Position of the drill hole, I do not have that data at this time.

All of the workers who will be either excavating the Glory Hole or who will be hired to drill the groundwater hole will be required to adhere to all of the established EPA rules governing working on the mine site.

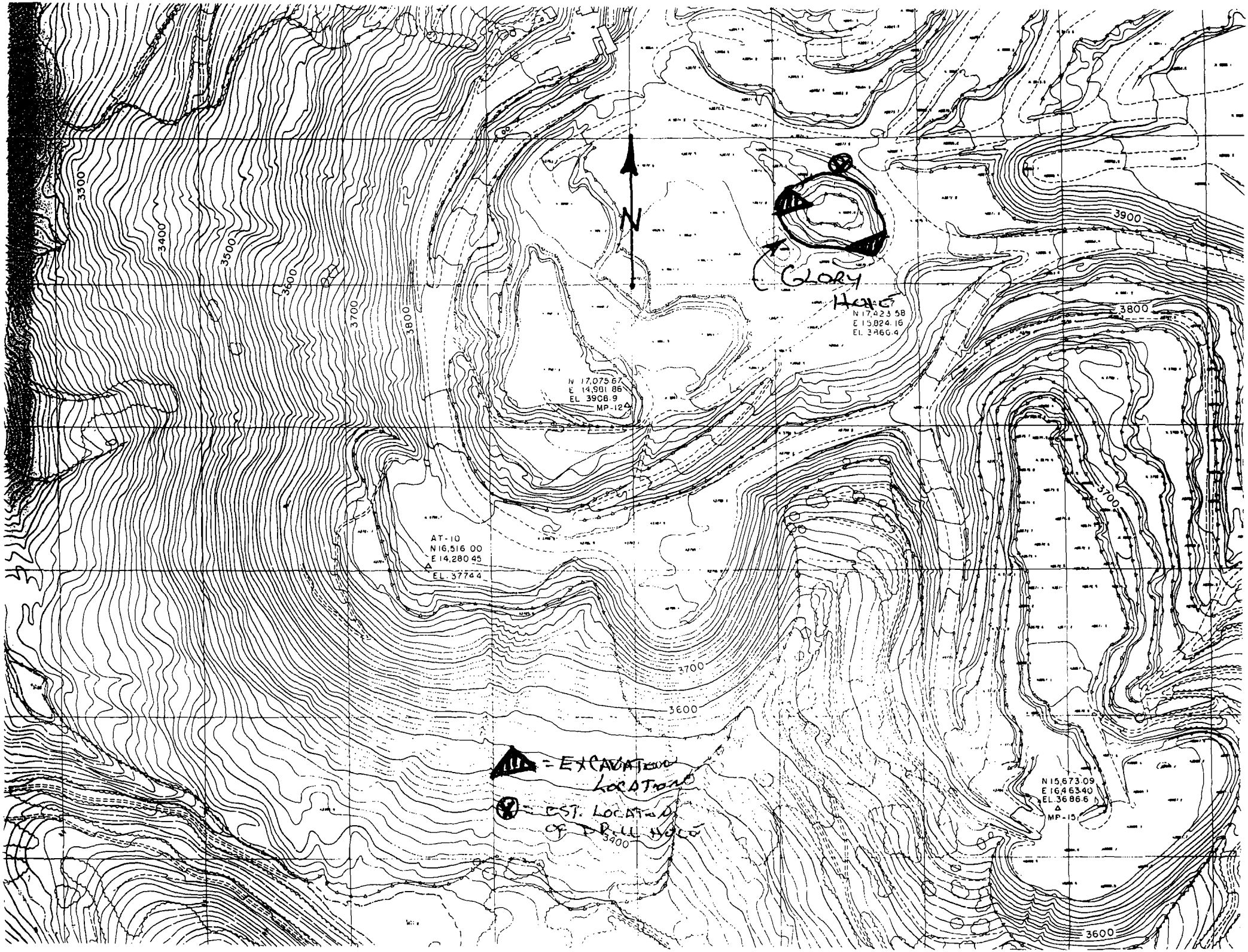
Although I have previously given you dates as to when we propose to complete this work, theLevel V restrictions and the recent changes in access requirements

mandated by Paul Perinard may not allow us to meet that time table. I will keep your appraised of any changes.

If there are some concerns or corrections to what I have laid out please give me a call as soon as possible.

Alan Stringer

Cc: John Constan DEQ


3300
3400
3500
3600
3700
3800
3900
N
GLORY HOLE
N 17,423.58
E 15,824.16
EL. 3860.4
N 17,075.67
E 14,991.86
EL. 3908.9
MP-124
AT-10
N 16,516.00
E 14,280.45
EL. 3774.4
= EXCAVATION LOCATION
= EST. LOCATION OF DRILL HOLE
N 15,673.09
E 16,463.40
EL. 3686.6
MP-151

GRACE

W.R. Grace & Co.
317 Mineral Ave.
P.O. Box 695
Libby,Mt. 59923

Tel: 406 293 3964
Fax: 406 293 3749

Paul Perinard
EPA On Scene Coordinator
517 Mineral Avenue
Libby, Mt. 59923

September 8, 2000

Paul,

This is a summary of the conference call we had on Wednesday September 6, 2000. If there is something I have missed or is incorrect please let me know.

Conference call participants: Paul Perinard EPA
Duc Nguyen EPA
John Constan Montana DEQ
Jim Stout Project Manager URS
Alan Stringer W.R. Grace

The reason for the call was to address the numerous projects on the Mine Site that need to be accomplished before the weather prevents any further work. The following are the projects that we discussed:

- Glory Hole Excavation
- Glory Hole Ground Water Well
- Old Waste Dump Ground Water Well
- Piezometer Readings in Tailings Dam
- Tailings Dam Toe Drain Maintenance
- Cross Drain Maintenance on Steep Face of Tailings Pile
- Access for Engineering Design Work on Steep Face of Tailings Pile
- Harvest of Timber Blow Down on Back Side of Mine Site
- Overburden Stripping in Lower Gravel Pit
- Repair and Replacement of "No Hunting/No Trespassing" signs
- Weed Control
- Slash Burning

The last item was missed, but I don't see any problem as all work required will occur long after the fall wet weather sets in. We can address it at the time the work needs to be done

It is understood that it may be necessary to modify these work procedures if there is a finding of significant fibers in the air as a result of any increased traffic along the access roadway.

Glory Hole Excavation

Excavation of the Glory hole will start on Wednesday September 13, 2000. **All work will be done using an operator who has been HAZWOPER trained and using all required PPE.** DEQ and EPA representatives will be present at the start of excavation. A qualified technician will perform P.I.D., F.I.D. and PCB testing during the excavation. Water and soil samples will also be collected from each excavation site. Both DEQ and EPA representatives will inspect the site on either Thursday afternoon September 14,2000 or early Friday morning September 15, 2000.

Glory Hole Ground Water Well

A ground water test well will be drilled adjacent to the glory hole at a point previously identified by the Montana DEQ. This hole will be to a depth where water is first encountered. A water sample will be taken and the hole will be capped. **Qualified drillers using the required PPE will do the work of drilling this hole. The drillers will not be required to have HAZWOPER training, but will have to show proof that they can wear a respirator. All drilling equipment will be dECONed prior to leaving the property.**

Old Waste Dump Ground Water Well

A ground water test well will be drilled at the foot of the old waste dumpsite, which was cleaned up under the supervision of the DEQ in 1995-1996. **This area is in timbered area and will not require any special precautions other than PPE**.

Piezometer Readings in Tailings Dam

A part of insuring long term stability of the tailings dam is monitoring the phreatic surface in the face of the dam. A series of Piezometer wells are placed across the face of the dam and as part of our Dam permit and monthly readings are required.
Work on this project will require only the use of Tyvek suits.

Tailings Dam Toe Drain Maintenance

This is the same issue as the Piezometer readings. **Work will only require the use of Tyvek suits.**

Cross Drain Maintenance on Steep Face of Tailings Pile

There is some minor maintenance work needed on the steep part of the tailings pile that if left unchecked will result in significant erosion in the spring. **All work performed will be done using all required PPE.**

Access for Engineering Design Work on Steep Face of Tailings Pile

As part of the continuing reclamation work on the 125 acres that are still permitted under the Montana Mine Reclamation Act, we are required to develop a plan for restoration of the over steep area of the coarse tailings pile. This work will require significant engineering design in order to get approval of the Montana DEQ . A number of on site inspections, by a contracted engineering firm will be required. This work is not intended to be invasive, but only visual assessment. **Anyone who takes part in this type of work will only be required to wear a Tyvek suit.**

Harvest of Timber Blow Down on Back Side of Mine Site

There is a significant amount of blow down Spruce in the southeast section of the property. This timber needs to be harvested before it looses it's value or becomes a future fire hazard. If we move quickly the timber can be accessed without having to go through the main mine site. We can get to it from the Carney Creek drainage as long as the weather remains relatively dry. **The wearing of PPE will not be required for this project.**

Overburden Stripping in Lower Gravel Pit

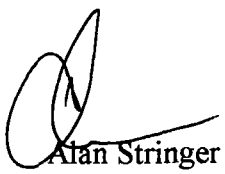
KDC has a permitted gravel pit approximately 1 mile up Rainey Creek Road from Highway 37. It is anticipated that gravel from this pit will be used as part of the replacement for any soil removed from the Export Site. In preparation for that usage, overburden removal has to be accomplished as soon as possible. **The wearing of PPE will not be required for this project.**

Repair and Replacement of "No Hunting/No Trespassing" signs

There is an annual need to either replace torn down or repair damaged "No Hunting/No Trespassing" signs. This is done just prior to the start of hunting season. All signs are adjacent to roadways and do not require access to the interior of the mine site. **The wearing of PPE will not be required for this project.**

Weed Control

Weed control for this year has, for all practical purposes, been completed. However, there may still be a few areas where work needs to be done. **If there is some work to be accomplished, within the mine site, it will be done using Tyvek suits and any other PPE as required for the spraying of a herbicide.**



Alan Stringer

URS

8 September 2000

Mr. Paul Peronard
USEPA
EPR-SA
999 18th St, Suite 500
Denver, CO 80202

Mr. John Constan
Remediation Division
Montana Department of Environmental Quality
2209 Phoenix Ave.
Helena, MT 59620-0901

Re: Modification to Task Order #01, Excavation of Glory Hole

Gentlemen:

This letter transmits a modified version of Task Order #01 regarding procedures for excavating and testing the Glory Hole. Modifications were made to the 7 September 2000 Task Order so that it is consistent with the excavation plan submitted to Mr. Patrick Plantenberg dated 25 August 2000. The primary change in the Task Order clarifies that two (2) test pits will be excavated and defines the extent of those excavations in the Glory Hole.

The attached Task Order, as modified, replaces the document that was faxed to each of you on 7 September 2000. We apologize for any inconvenience this modification may have caused. If you have any questions or comments, please call me at (303) 882-5271.

Sincerely,

Jim Stout
Project Coordinator
Libby Asbestos Site

Cc: Alan Stringer, WR Grace
Pete Pendrak, URS
File

URS Corporation
707 17th Street, Suite 3400
Denver, CO 80202
Tel: 303.292.0800
Fax: 303.292.5660

URS

TASK ORDER #01 (Modified)

Excavation of Glory Hole, Vermiculite Mine
Libby Asbestos Site, Libby Montana

8 September 2000

Objective

The objective of this task is to investigate the nature and extent of buried debris within the area known as the Glory Hole at the vermiculite mine. It is suspected that demolition debris from the shutdown of vermiculite mining operations was buried in a pit at the mine site. The suspected area (Glory Hole) where the debris was buried currently exists as a shallow depression. At the direction of the EPA, Grace plans to excavate two test pits n the area and segregate any debris so that it can be inspected. Of particular concern is the possibility that equipment containing PCBs or possibly volatile organic hydrocarbons (VOCs) may have been buried at the site.

Scope of Work

The planned work scope was previously communicated to the Montana Department of Environmental Quality in a letter to Mr. Patrick Plantenberg dated 25 August 2000. This task order provides additional details including the plans to monitor and sample the pits.

URS will mobilize excavation equipment and personnel to the site. The excavation will proceed by placing overburden soil on one side of each pit and any debris that is uncovered on the other. The excavator bucket will be equipped with a claw to facilitate debris removal.

As the excavation progresses soil and debris removed will be closely examined for indications that liquid contaminants may have been buried at this location. Soil that appears to be discolored or shows other potential signs of contaminant impacts will be tested on site for PCBs using field test kits and for VOCs using the jar headspace method. PID and FID analyzers will be available for headspace measurements.

URS will also maintain a supply of sample bottles at the excavation in the event that unexpected free liquids are encountered. Any liquids found will be collected for analysis of PCBs and VOCs at an approved laboratory. Preservative will be available with the sample bottles, along with coolers and ice.

The area and extent of excavation will be consistent with the Plan submitted dated August 25th. Two areas of approximately 3,500 ft^2 each will excavated to a depth sufficient to allow for a complete inspection of what was buried. Samples will be collected away from the excavation by taking an aliquot of soil from the excavator bucket. No personnel will be permitted to enter the excavation.

URS

Once the excavation is complete the debris will be reburied and the overburden placed back on top of the material and tracked with the excavator or dozer.

Erosion Control
During the excavation process, runon and runoff controls will be established to prevent precipitation from flowing into the excavated area. Berms will also be established to prevent water from flowing onto or off of the debris staging area. The overburden piles and debris piles will be moistened as necessary to control blowing litter or dust.

Health and Safety
Personnel working at the excavation site will be required to be in Level C PPE with respirators. Work will be conducted according to the Health and Safety Plan included in Appendix B of the "Work Plan for Removal of Asbestos and Vermiculite at the Libby Asbestos Site" (28 July 2000). The H&S Plan will be amended as necessary to cover this excavation activity.

Schedule
Excavation of the Glory Hole is tentatively scheduled to begin on Wednesday, 13 September 2000.

Price Sheet [redacted]

B & B Drilling, Inc.

PO Box 967
Libby, MT 59923
(406) 293-4029

DATE	INVOICE #
9/11/00	

BILL TO
KDC

TERMS	DUE DATE
Due on receipt	9/11/00

QUANTITY	ITEM CODE	DESCRIPTION	PRICE EACH	AMOUNT
50	Drilling 6	6" Drilling with 6 X .250" steel casing 50 ft minimum per hole	25.00	1,250.00
0	Drilling 6	6" Drilling with 6 X .250" steel casing or DTH rock drilling	22.50	0.00
2	Mob/Demob	Mobilization of equipment to and from site	250.00	500.00
0	Well Screen	PVC sch 40 flush thrd. 10 or 20 slot, 4" per 5 ft	60.00	0.00
0	PVC pipe	4" sch 40 riser pipe , per 10 ft	62.00	0.00
0	Bentonite	per bag	6.50	0.00
0	silica sand	per bag	9.50	0.00
2	Caps	4" FJ bottom caps	24.00	48.00
2	Plugs	4" FJ top plugs	24.00	48.00
2	Well Cap	Steel locking caps	35.00	70.00
0	Labor	Monitor well completion per hr.	125.00	0.00

	Total	**$1,916.00**

URS

URS

Project No. 80569
File Code No. 3.5 R 6.14
Doc No.

15 September 2000

DENVER FILE

Mr. Paul Peronard
USEPA
EPR-SA
999 18th St, Suite 500
Denver, CO 80202

Paul Peronard
USEPA
501 Mineral Avenue
Libby, Montana 59923

Mr. John Constan
Remediation Division
Montana Department of Environmental Quality
2209 Phoenix Ave.
Helena, MT 59620-0901

Re: Task Order #02, Installation of Monitoring Wells at the Glory Hole

Gentlemen:

This letter transmits Task Order #02 regarding procedures for drilling and installing two monitoring wells at the vermiculite site known as the Glory Hole.

If you have any questions or comments, please call me at (303) 882-5271.

Sincerely,

for Jim Stout
Project Coordinator
Libby Asbestos Site

CWinn

cc: Alan Stringer, WR Grace
Pete Pendrak, URS
File

URS Corporation
707 17th Street, Suite 1400
Denver, CO 80202
Tel 303 292 0600
Fax 303 293 5860

URS

TASK ORDER #02

Installation of Monitoring Wells, Vermiculite Mine
Libby Asbestos Site, Libby Montana

14 September 2000

Objective

The objective of this task is to drill boreholes and install two monitoring wells at the vermiculite mine site near the area known as the Glory Hole. The completed monitoring wells will provide a means for collecting samples of groundwater in the area for subsequent chemical analyses. The wells will be installed according to Montana guidelines for groundwater monitoring wells using a local drilling company -- B&B Drilling.

The Montana Department of Environmental Quality (DEQ) requested that W.R. Grace install the wells as part of investigative work associated with debris suspected of being previously deposited in the Glory Hole. W.R. Grace subsequently directed URS Corporation to prepare this Task Order and oversee the work.

Scope of Work

Two monitoring wells will be installed. Monitoring well #01 will be drilled on the north edge of the Glory Hole. Monitoring well #02 will be drilled below the old waste dump and above the "16% Haul Road." The wells will be completed within the first water zone encountered. It is anticipated that first water will be associated with relatively shallow perched water zones that exist in the area of the Glory Hole. If perched water is not encountered, the well borings will be continued to a depth of up to 250 feet.

Borehole Drilling -- Mud or air rotary drilling techniques will be used to drill the well boreholes. Each boring will be approximately 6-inches in diameter. Drill cuttings will be staged adjacent to each of the wells pending a decision on their ultimate disposal. The boreholes will not be logged using downhole tools. Rather, qualitative documentation of the lithology may be documented based on the cuttings exiting the borehole during drilling. The drilling activity will be directed by a URS geologist working with a local drilling company.

It is anticipated that borehole #01 may be advanced as deep as 250 feet below the surface if no significant perched water zone is encountered. The URS geologist will consult with the drilling supervisor to determine where groundwater is encountered and the approximate thickness of the saturated zone. Once a significant water bearing zone is reached, the borehole will be advanced a minimum of 5 feet into the zone before drilling is terminated. Again, the objective is to complete the wells at "first water."

URS

Based on historical information, it is anticipated that borehole #02 will encounter groundwater within 40 feet of the ground surface.

Well Construction -- Each monitoring well will be constructed of 2-inch diameter, flush-threaded schedule 80 PVC casing. A 5-foot long, continuous-wrap factory-slotted PVC screen section will be attached to the bottom of the casing string. The slot size will be determined in consultation with the URS on-site geologist, but it is anticipated that .010-inch slotted well screen will be sufficient.

The well casing and screen will be installed through the drilling augers. Centralizers may be required if the well is deeper than 50 feet. Once the well casing is in place, a sand pack will be placed around the screened section and extend approximately 2-feet above the screen. The grain size of the sand will be determined by the URS geologist so that it is appropriate for the selected screen slot size. After the sand pack is placed a minimum 2-foot thick bentonite chip/pellet seal will be placed above it. A cement-bentonite grout will be placed above the bentonite seal all the way to within 1-2 feet of the surface.

The well casing will extent approximately 2-feet above the surface. A 4- or 6-inch steel protective casing will be installed around the casing and extend a minimum of 1-foot below the surface. This protective casing will be held in place a concrete collar placed around the well.

The well will be capped with a water tight lid. The protective steel casing will include a locking cap as well. If necessary, three protective bollards will be installed around the well to prevent vehicles from accidently striking the well casing. The well should be finished by painting it with a highly visible color.

Well Development -- Approximately 24 hours after installation, the monitoring wells will be developed using downhole pumps and/or bailers and surge blocks. Development should continue until water pumped from the well is relatively clear of sediment. The URS geologist will determine the extent of development necessary.

Development water will be containerized on site pending the results of the groundwater analyses. If the water is not contaminated it will be discharge to the ground surface. If the water is determined to be contaminated, appropriate disposal alternatives will be evaluated.

Groundwater Sampling and Analyses -- After the wells have been properly developed, samples will be collected using bailers or downwell pumps. Samples will be collected for analysis of:

- Volatile organic compounds (VOCs) using EPA Method 8260;
- Semi-volatile organic compounds (SVOCs) using EPA Method 8270;
- PCBs using EPA Method 8080 (or equivalent); and
- RCRA metals.

URS

The samples will be collected into appropriate bottles and preserved if necessary. The samples will be placed into coolers containing ice for shipment to the selected laboratory. Standard sample labeling and chain-of-custody procedures will be followed.

Health and Safety

Personnel conducting the well installations will be required to be in Level C PPE with respirators. Work will be conducted according to the Health and Safety Plan included in Appendix B of the "Work Plan for Removal of Asbestos and Vermiculite at the Libby Asbestos Site" (28 July 2000). The H&S Plan will be amended as necessary to cover this excavation activity. All of the personnel involved with this field effort will be required to have OSHA 40-hr HAZWOPER training.

Schedule

It is anticipated that the wells will be installed during the week of September 18 or 25. The wells will be installed after excavation efforts are completed at the Glory Hole.

GRACE

W.R. Grace & Co.
317 Mineral Ave.
P.O. Box 695
Libby,Mt. 59923

Tel: 406 293 3964
Fax: 406 293 3749

Patrick Plantenberg
Montana Dept. of Environmental Quality
P.O. Box 200901
Helena, Montana 59620-0901

September 28, 2000

Pat:

This is to recap what work has been done to the action items laid out in your report of July 26,2000.

Item #1: Glory Hole excavation

On Sept 14th and 15th two trenches were excavated. The trenches were approximately 50 feet long by 25-30 feet wide and to a depth that reached the bottom of the glory hole. Present at the excavation were a representative from the EPA as well as the Montana DEQ. Monitoring samples using FID and PID were taken periodically during the excavation. Air monitoring stations were also set up around the excavation site. Nothing unusual was found and all the soil was dry from top to bottom. The excavations were filled back in on Friday the 15th.

Item #2 Monitoring well at Glory Hole

On Sept 21st and 22nd a monitoring well was drilling adjacent to the Glory Hole. The hole was drilled to a depth of 250 feet without any indication of hitting measurable water. However, before pulling off of the well we opted to let it sit until Monday morning the 25th. On the 25th we found water in the hole and estimated that about 1 to 2 gallons a minute were coming in at the 242-foot level. This well will be fully developed and established as a monitoring well. This work as well as sampling of the water will be done either the week of October 2 or the following week, depending on delivery of equipment.

Item #3 Monitoring well at toe of old waste dump

On September 26th a monitoring well was drilled at the toe of the old waste dump. The hole was drilled to a depth of 90 feet. A small amount of water was intercepted. This well will be developed and sampled at the same time as outlined for the Glory Hole well.

Item #4 Coarse Tailings Area

In late August and early September I had a survey of the over steep area performed. The intent was to develop an accurate contour map of the entire area, which could be used to develop a comprehensive plan for stabilization of the hillside. The survey company has told me, that there exists a problem with tying into to our original database. Tying into the area that is not in question is key if we are to come up with a viable plan. There has been a lot of delay in getting this corrected. Most of the delay is attributed to the PPE access requirements mandated by the EPA. This has been resolved and the survey company is now back on the property as of this date. I hope to have a completed contour map by the second or third week of October. It is my intent to then provide this information to a couple of engineering firms who will help me develop a plan. At this time I cannot meet your October 1 deadline for providing a plan, but will do so as soon as possible.

If you have any questions please give me a call.

Alan Stringer

URS

DENVER FILE

Well #: MW-1

LOG OF DRILLING OPERATIONS

PROJECT	WR Grace, Libby, MT	LOCATION	Vermiculite Mine
TOTAL DEPTH	251.7 ft. bgs	START DATE	9/21/00 1024
FINISH DATE	9/22/00 1755		
GEOLOGIST	Jeff Bader	APPROVED BY	JWB
R.G.#	556		
DRILLING COMPANY	B&B Drilling	DRILLER	David Iliff
DRILLING METHOD	Air Rotary/Compression	EQUIPMENT	Becyrus Erie
DRILL BIT TYPE AND SIZE	6 in.		
BORING LOCATION (ST. ADDRESS OR DESCRIPTION)	Vermiculite Mine		

Depth Below Surface (ft)	Lithologic Description Color, Texture, Moisture, etc.	Graphic Log	Well Construction Details and Comments
0	**Fill** Mafic igneous rock. Medium grained, gray, feldspar and mafic minerals (pyroxene).		Spud 10:24.
5	**Vermiculite** Greenish brown, flakes of biotite, very loose, dry.		Cuttings at 4 ft.; difficulty drilling.
10			
15			
20	**Pyroxinite with varying amounts of pyroxene and feldspar** Very dry, greenish gray, coarse grained, hard.		Cuttings at 20 ft.; very dry.
25			Second pipe on at 11:12, drilling slow.
30			
35	**Felsic vein or sill**		Cuttings at 34-35 ft.
	Pyroxinite with varying amounts of pyroxene and feldspar Very dry, greenish gray, coarse grained, hard.		
40			Cuttings at 40 ft.; third pipe on at 11:40; slow drilling.
45			
50			Centralizer placed at 50 ft. during well construction.
55	**Felsic vein or sill**		Cuttings at 55 ft.; slow drilling.
	Pyroxinite with varying amounts of feldspar and pyroxene Medium grained, dark gray, coarse grained, hard.		
60			Cuttings at 60 ft.; fourth pipe on at 1220; slow drilling.
65			
70			Cuttings at 70 ft.; very slow drilling.
75			
80	**Biotite pyroxinite** Varying amounts of biotite, pyroxene, and feldspar. Biotite 10-60%, coarse grained, hard.		Fifth pipe on at 14:21; drilling faster at 82 ft.
85			Cuttings at 88 ft.
90			Cuttings at 91 ft.
95			Cuttings at 95 ft.
100			

50.0

100.0

NOTES

MW= Monitoring Well

ft= Feet

bgs= below ground surface

First ▽ 240.00

Final ▼ 192.50

URS

LOG OF DRILLING OPERATIONS

Well #: MW-1

PROJECT WR Grace, Libby, MT LOCATION Vermiculite Mine

Depth Below Surface (ft)	Lithologic Description Color, Texture, Moisture, etc.	Graphic Log	Well Construction Details and Comments
100			Cuttings at 100 ft.; sixth pipe on at 1510. Centralizer placed at 100 ft. during well construction.
105			
110	Trace tremolite		Cuttings at 109 ft.
115	Trace diposide, sphene, and tremolite		Cuttings at 113 ft. Clean pipes at 1555.
120			Driller out of water at 1610. Resume drilling at 0939 on 09/22/00; clean out hole; seventh pipe on at 0957.
125			Cuttings at 125 ft.
130	Trace tremolite		Cuttings at 130 ft.; drilling faster.
135	Trace tremolite and diopside		Cuttings at 136 ft.; eighth pipe on at 1104.
140			
145	Trace diopside		Cuttings at 145 ft.; drilling faster.
150			Cuttings at 150 ft.; centralizer placed at 150 ft. during well construction. 150.0
155			Cuttings at 155 ft.; ninth pipe on at 1147.
160			Cuttings at 160 ft.
165	Trace tremolite		Cuttings at 162 ft.
170			Cuttings at 166 ft. Cuttings at 168 ft. Cuttings at 170 ft.; drilling slower.
175			Cuttings at 175 ft. Cuttings at 176 ft.
180			Cuttings at 180 ft.; clean-up hole; tenth pipe on at 1440.
185			Cuttings from 186 ft.
190			
195			Slow drilling; dry; water pump off; bit grinding the pyroxenite to powder and "gritty" gravel.
200			Centralizer placed at 200 ft. during well construction. 200.0
205			Cuttings at 202 ft.; eleventh pipe on at 1554. Very dry cuttings.
210			Cuttings at 210 ft.; very dry.
215			
220			Cuttings at 218 ft.; very dry. 219.0 Twelveth pipe on at 1642.
225			Cuttings at 222 ft., cuttings dry. Very dry.

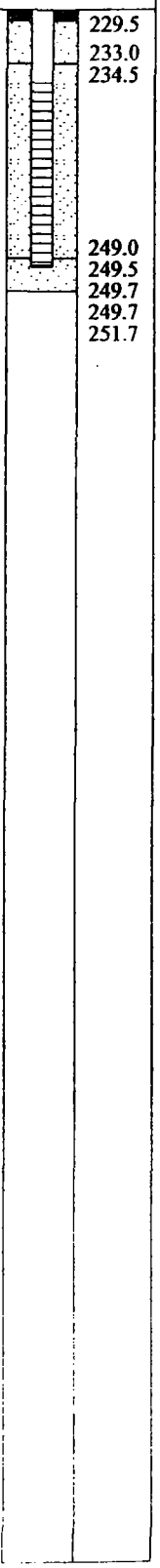
URS

LOG OF DRILLING OPERATIONS

Well #: MW-1

PROJECT: WR Grace, Libby, MT LOCATION: Vermiculite Mine

Depth Below Surface (ft)	Lithologic Description Color, Texture, Moisture, etc.	Graphic Log	Well Construction Details and Comments
230			Thirteenth pipe on at 1705.
235	**Biotite 5%**		Centralizer placed near top of screen (approximately 233 ft.) during well construction.
240	**Trace tremolite, biotite 5%**		Very dry. ▽ Cuttings at 240 ft., oxidized, fractures; discharge approximately 1-2 gpm.
245			Drilling hanging up/gummed up; fourteenth pipe on at 1730.
250			Cuttings at 245 ft; very dry. Cuttings at 248 ft; very dry.
255			Centralizer placed near bottom of screen (approximately 249 ft.) during well construction.
260			Boring terminated at 1755; reached groundwater.
265			
270			
275			
280			
285			
290			
295			
300			
305			
310			
315			
320			
325			
330			
335			
340			
345			
350			
355			



WELL CONSTRUCTION DETAILS AND ABANDONMENT FORM

FIELD REPRESENTATIVE: Jeffrey W Bader
DRILLING CONTRACTOR: B+B Drilling
DRILLING TECHNIQUE: Air rotary/compression
AUGER SIZE AND TYPE: NA
BOREHOLE IDENTIFICATION: ~~MW-1~~ MW-1
BOREHOLE DIAMETER: 6"
WELL IDENTIFICATION: ~~MW-1~~ MW-1
WELL CONSTRUCTION START DATE: 9/21/00
WELL CONSTRUCTION COMPLETE DATE: 10/4/00

SCREEN MATERIAL: PVC Sch. 80 - Cont. wrap
SCREEN DIAMETER: 2" /0.02
STRATUM-SCREENED INTERVAL (FT): 234.5 - ~~249.7~~

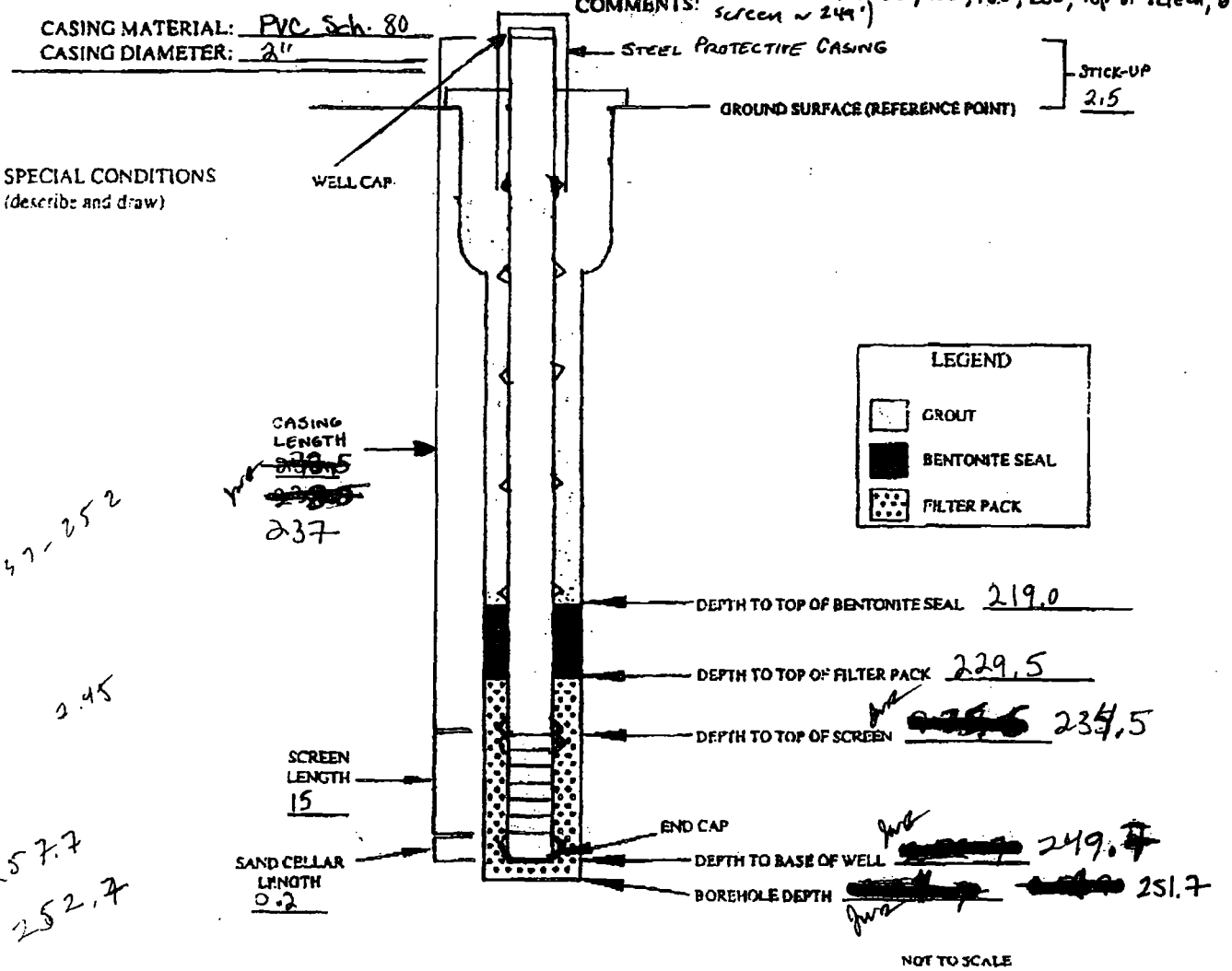
CASING MATERIAL: PVC Sch. 80
CASING DIAMETER: 2"

TYPE OF FILTER PACK: Colorado Silica Sand
GRADIATION: 10/20
AMOUNT OF FILTER PACK USED: 8 bags (50 lb bags)
TYPE OF BENTONITE: Chips Western Bentonite
AMOUNT BENTONITE USED: 2 bags (50 lb bags)
TYPE OF CEMENT: Holnam - 94 lb bags (Portland)
AMOUNT CEMENT USED:
GROUT MATERIALS USED: 4% bentonite powder (3 bags) Tremied in

DIMENSIONS OF SECURITY BOX: 6" diameter
TYPE OF WELL CAP: Stop Threaded
TYPE OF END CAP: Threaded

COMMENTS: Centralizers at 50', 100', 150', 200', top of screen (~~234~~ 235'), bottom of screen ~ 249')

SPECIAL CONDITIONS
(describe and draw)



247 - 252
1.45
1.45
15
0.2
260.2
255.2
257.7
252.7

INSTALLED BY: David Iliff INSTALLATION OBSERVED BY: Jeffrey W Bader

DISCREPANCIES

URS
Project No. 805169
File Code No. 12.2
Doc No. 1

DENVER FILE

DENVER FILE

WELL DEVELOPMENT RECORD

Field Copy
10/10/00 gw

WELL/PIEZOMETER ID MW-1
SHEET 1 of 1

PROJECT NAME: WR Grace PROJECT NO.: 805169.30 DATE: 10/5/00

LOCATION: Minde DATE INSTALLED: 10/4/00

TOTAL DEPTH (FTOC) 252.2 CASING DIAMETER 2"

METHODS OF DEVELOPMENT

☐ Swabbing ☒ Bailing ☐ Pumping ☒ Describe: Bailing and surging

Equipment decontaminated prior to development NA ☐ Yes ☐ NO

Describe: Using dedicated or disposable bailers

EQUIPMENT NUMBERS:

pH Meter NA EC Meter NA Turbidity Meter NA Thermometer NA

meters calibrated with DI water = pH = 7.3 Cond. 0.80 mS

CASING VOLUME INFORMATION:

Casing ID (inch)	1.0	1.5	2.0	2.2	3.0	4.0	4.3	5.0	6.0	7.0	8.0
Unit Casing Volume (A) (gal/ft)	0.04	0.09	0.16	0.2	0.37	0.65	0.75	1.0	1.5	2.0	2.6

PURGING INFORMATION:

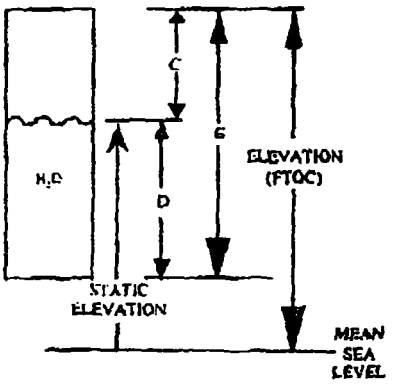
Measured Well Depth (B) 252.2 ft.

Measured Water Level Depth (C) 195.38 ft.

Length of Static Water Column (D) 252.2 (B) - 195.38 (C) = 56.82 ft.

Casing Water Volume (E) = 0.16 (A) x 56.82 (D) = 9.09 gal

Total Purge Volume = 27.27 (gal)



Date	Time	Water Level (FTOC)	Volume Removed (gal)	pH	mS EC	Temperature F or C	Turbidity/ Sand (ppm)	Comments
10/5/00	1031	195.38	0.5	7.2	1.0	9.5	NA	Begin purging water clear no sediment in bailer
	1143	–	2.5	8.1	0.9	9	NA	water clear no sediment
	1334	–	4	8	0.8	10	NA	Surge well with bailer, Bailer catching after delay bore: no sediment.
	1358	–	6	8.1	0.8	10	NA	water clear parameters stable
	1420	–	8	8.1	0.8	10	NA	" " "
	1609	–	20	8.1	0.8	10	NA	" " "
	1651	–	24	8.0	0.8	10	NA	" " "
	1715	–	27	8.0	0.8	10	NA	" " " "
	1720	–			7			Sample well
					High			EPA 8240 & 8270 & 8081 RCRA Metals

DI read 9.1, after sampling well. prior

UES
Project No. 805169
File Code No. 12.3

KDC

Kootenai Development Co.
317 Mineral Ave.
P.O. Box 695
Libby,Mt. 59923

Tel: 406 293 3964
Fax: 406 293 3749

Patrick Plantenberg
Montana Dept. of Environmental Quality
P.O. Box 200901
Helena, Montana 59620-0901

December 18, 2000

Dear Pat,

I am enclosing results of the water samples taken from the two monitoring wells that were drilled on KDC property. MW1 is the well that was drilled next to the Glory Hole. MW2 is the well that drilled at the bottom of the old waste disposal area.

Please call me if you have any questions.

Alan Stringer

Cc: John Constan Mt. DEQ
Paul Perinard EPA
David Cleary
William Corcoran

Montana Department of
ENVIRONMENTAL QUALITY
Marc Racicot, Governor

P.O. Box 200901 • Helena, MT 59620-0901 • (406) 444-2544 • E-mail: www.deq.state.mt.us

December 29, 2000

Mr. Alan Stringer
Kootenai Development Co.
317 Mineral Ave.
P.O. Box 695
Libby, MT 59923

Re: Water Quality Monitoring for Wells on KDC Property

Dear Mr Stringer:

We have reviewed the results for samples collected in October 2000 from wells MW-1 and MW-2. Well MW-1 (Glory Hole) appears to be clean and does not need to be placed on a regular monitoring schedule. However, the well should be sampled one more time in the spring to confirm the October results. Well MW-2 (waste disposal) showed exceedences of Montana groundwater standards for lead and arsenic. This well should be sampled quarterly for one year at which time DEQ will determine if continued monitoring is needed.

If organic compounds do not show up in the next sampling event, they can be dropped from the parameter list. In addition to the inorganic parameters analyzed in October, please add antimony, beryllium, copper, iron, manganese, mercury, nickel, nitrate+nitrite, thallium, and zinc to the parameter list for both wells. Be sure that the detection limits used by the lab are low enough to determine compliance with WQB-7 groundwater standards.

If you have any questions, please call me at 444-4949.

Sincerely,

Joe Gurrieri, Hydrologist
Environmental Management Bureau

Cc: John Constan
Paul Perinard

Montana Department of
ENVIRONMENTAL QUALITY
Judy H. Martz, Governor
P.O. Box 200901 • Helena, MT 59620-0901 • (406) 444-2544 • www.deq.state.mt.us

July 30, 2001

Alan Stringer
Kootenai Development Company
P. O. Box 695
Libby, MT 59923

RE: Approval of Minor Revision 01-001 to Operating Permit 00010

Dear Mr. Stringer:

The Montana Department of Environmental Quality (DEQ), Environmental Management Bureau has reviewed Kootenai Development Company's (KDC) May 4, 2001 request for Minor Revision 01-001 to Operating Permit 00010. DEQ has considered the request to place the materials hauled from the old export facility into the Glory Hole. Based on the negative results from the trench testing and water monitoring conducted at the site, DEQ agrees that it is appropriate to complete the mounding of the Glory Hole using the materials. This is consistent with recommendations made by DEQ on past mine site inspections.

No changes in the reclamation bond are required.

If you have any questions, call me at 406-444-4960.

Sincerely,

Patrick Plantenberg
Operating Permit Section Supervisor
Environmental Management Bureau

Cc: Jan Sensibaugh, DEQ
Tom Ellerhoff, DEQ
Sandi Olsen, DEQ

File 00010.352

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JN

MR01-001

KOOTENAI DEVELOPMENT COMPANY 00010.352

PO BOX 695
LIBBY, MT. 59923

TEL 406 293 3964
FAX 406 293 3749

RECEIVED
MAY 07 2001
DEPT. ENVIRONMENTAL QUALITY

Patrick Plantenberg
Montana Dept. of Environmental Quality
P.O. Box 200901
Helena, Montana 59620-0901

RE: Minor Revision to Operating Permit #00010

May 4, 2001

Dear Pat:

KDC is applying for a Minor Revision to permit #00010 in order to allow for the disposal of waste material from a former Grace operating facilities. The removal action is being done at the direction of EPA Region 8. The Mine Site itself has been identified by the EPA, MDEQ, and W.R.Grace as the preferred disposal location for asbestos-contaminated soil and debris removed from the Export Plant.

There are currently 125 acres still under permit. The intent is to have approximately 1,500 cu. yd. of material that was hauled from the export facility to be used as cover for the Glory Hole. The material will be used to complete the filling of the hole as well to create a crowned surface over the top of the entire area.

Once the transfer of the material into the Glory Hole is completed, the permitted area will be planted with a grass seed mixture that is consistent with other recommendations made by DEQ during past mine inspections.

Sincerely,

Alan R. Stringer

00010
.352
KDC request
for action on
MR01-01

Plantenberg, Pat

From: Alan.R.Stringer@grace.com
Sent: Monday, July 30, 2001 12:05 PM
To: pplantenberg@state.mt.us
Subject: Glory Hole

Pat

On May 4, 2001 I sent in a request for an amendment to Permit #00010 to allow us to put the material hauled from the export facility into the Glory Hole. I have yet to hear anything back from you. Today I received a letter from Paul Peronard indicating that this must be done and that under CERCLA "No federal, state, or local permits are required for on-site response actions...." If we don't move the dirt he is going to do it. He has copied Jan Sensibaugh the letter he sent to me.

I have left you a phone message.. please call me. 406 293 3964.

ARROWHEAD ENGINEERING, Inc.
David M. Cosgriff P.E.

P.O. Box 843
1504 Kaniksu Avenue
Libby, Montana 59923

Phone (406) 293-9387
Fax (406) 293-8922
Email arrowhead@libby.org

October 29, 2001

Mr. Alan Stringer
W.R. Grace
317 Mineral Avenue
Libby, MT 59923

Re: **Data Summary Letter Report**
MW-1 and MW-2 Sample Results – September 2001

Dear Mr. Stringer:

The purpose of this letter report is to provide you with the results of the ground water sampling that was completed for monitoring well MW-1 (Waste Dump) and monitoring well MW-2 (Waste Disposal) on the KDC property on September 18, 2001. The sampling was conducted to comply with the letter from Montana Department of Environmental Quality (MDEQ) dated December 29, 2000 which requested additional ground water quality monitoring on the KDC property. The ground water samples collected from MW-1 and MW-2 were analyzed for the same constituents as the initial sample of the MW-2 well on October 5, 2000 with the addition of the analysis requested by MDEQ in the December 29, 2000 letter and asbestos in water.

The samples were collected, handled and shipped in accordance with standard practice and standard operating procedures detailed in "Environmental investigations, standard operating procedures and quality assurance manual. U.S. Environmental Protection Agency, Washington, DC (U.S. EPA. 1997), as appropriate. The samples were shipped via UPS courier to Columbia Analytical Services, Inc. (CAS) in Kelso, Washington for analysis. Copies of the Field Data Sheets are attached to this letter (Attachment 1). Copies of the chain-of-custodies are included with the data package from CAS (Attachment 2).

The data summary tables (Attachment 3) present the results of the analysis from the October 5, 2000, April 2001 and September 2001 monitoring events for monitoring well MW-2. The September 2001 analysis indicate that lead and arsenic concentrations exceed the ground water standards for WQB-7 similar to the results obtained with the April 2001 monitoring event. However, for monitoring well MW-1, there were no detections of metals above the WQB-7 standards.

The EPA Method 8270C for semivolatile organics did not show any detectable concentrations above the CAS detection limits for either MW-1 or MW-2 on September 18, 2001. Similarly, the EPA Method 8260 for purgeable organics by GC/MS did not show detectable concentrations of any compound except for trichlorofluoromethane at 0.60 ppb in MW-1. This was detected just above the MRL of 0.50 ppb and is well below the WQB-7 standard for trichlorofluoromethane of 10,000 ppb.

The ground water samples from both MW-1 and MW-2 were also analyzed for asbestos in water by Method 100.2 (TEM). The sample from MW-1 did contain detectable asbestos in water at 0.832 mfl which is below the WQB-7 standard of 7 mfl/mcl. The sample from MW-2 did not contain detectable concentrations of asbestos, however, due to the turbidity of the sample, the detection limit was elevated by the laboratory. Therefore, the asbestosis in water was reported as <6.658 million fibers per liter. The PCB analysis also did not show any detections for either sample MW-1 or MW-2.

The next monitoring event for MW-2 is scheduled for the fourth quarter in 2001. Due to the water quality of MW-1, it is not anticipated that MW-1 will require additional sampling. If you have any questions regarding the preceding information or attached data, please give me a call at 406.293.1011.

Sincerely,

David Cosgriff, P.E.
Arrowhead Engineering, Inc.

Attachments 1 – Field Data Sheets
2 – CAS Data Report (September 2001 Samples)
3 – Data Summary Tables

C: File

COLUMBIA ANALYTICAL SERVICES, INC.

Client:	Arrowhead Engineering	**Service Request No.:**	K2106919
Project:	WR Grace-KDC Well Sampling	**Date Received:**	9/21/2001
Sample Matrix:	Water		

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of Columbia Analytical Services, Inc. (CAS). This report contains analytical results for samples designated for Tier II data deliverables. When appropriate to the method, method blank results have been reported with each analytical test. Surrogate recoveries have been reported for all applicable organic analyses. Additional quality control analyses reported herein include: Laboratory Duplicate (DUP), Matrix Spike (MS), Matrix/Duplicate Matrix Spike (MS/DMS), and Laboratory Control Sample (LCS).

Sample Receipt

Two water samples were received for analysis at Columbia Analytical Services on 9/21/2001. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

Total Metals

No anomalies associated with the analysis of these samples were observed.

PCB Aroclors by EPA Method 8082

No anomalies associated with the analysis of these samples were observed.

Volatile Organic Compounds by EPA Method 8260B

No anomalies associated with the analysis of these samples were observed.

Semivolatile Organic Compounds by EPA Method 8270C

Surrogate Exceptions:

The Terphenyl-d14 surrogate recovery for the Method Blank was above the normal CAS control limits (122 % versus a control limit of 120%). No target analytes were detected in the unspiked sample. The error associated with elevated recoveries equates to a high bias, thus the elevated recoveries likely has no significance to the sample results. No further corrective action was taken.

Lab Control Sample Exceptions:
The recoveries of Hexachloroethane, Benzoic acid, and Hexachlorobutadiene for Laboratory Control Sample (LCS) KWG0106136-3 were outside the lower advisory control criteria. The analytes in question were not detected in the associated field samples. The error associated with reduced recovery equates to a potential low bias. The Laboratory Control Sample is a spike of all analytes. Limits for some analytes, including Hexachloroethane, Benzoic acid, and Hexachlorobutadiene, are advisory because enough data points have not been collected to calculate statistically controlled recovery limits. Recoveries were acceptable in the duplicate matrix spikes from this batch. The data has been flagged to indicate the problem. No further corrective action was taken.

Asbestos

The analysis for Asbestos was subcontracted to LabCor, Inc.

Approved by _____ **Date** 10/19/01

Total Metals

METALS

- Cover Page -
INORGANIC ANALYSIS DATA PACKAGE

Client: Arrowhead Engineering Service Request: K2106919

Project No.:

Project Name: WR Grace-KDC Well Sampling

Sample No.	Lab Sample ID.
MW-1	K2106919-001
MW-1D	K2106919-001D
MW-1S	K2106919-001S
MW-2	K2106919-002
Method Blank	K2106919-MB

Were ICP interelement corrections applied? Yes/No YES

Were ICP background corrections applied? Yes/No YES

If yes-were raw data generated before application of background corrections? Yes/No NO

Comments:

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: [signature] Date: 10/18/01

METALS
-1-
INORGANIC ANALYSIS DATA SHEET

Client: Arrowhead Engineering
Project No.: NA
Project Name: WR Grace-KDC Well Sampling
Matrix: WATER

Service Request: K2106919
Date Collected: 09/18/01
Date Received: 09/21/01
Units: µG/L
Basis: NA

Sample Name: MW-1
Lab Code: K2106919-001

Analyte	Analysis Method	MRL	MDL	Dil.	Date Extracted	Date Analyzed	Result	C	Q
Antimony	200.8	0.05	0.05	1	9/28/01	10/17/01	0.11		
Arsenic	200.8	0.5	0.5	1	9/28/01	10/17/01	0.5	U	
Barium	6010B	5.0	5.0	1	9/28/01	10/2/01	94.2		
Beryllium	200.8	0.02	0.02	1	9/28/01	10/17/01	0.02	U	
Cadmium	200.8	0.05	0.05	1	9/28/01	10/17/01	0.05	U	
Chromium	200.8	0.2	0.2	1	9/28/01	10/17/01	7.0		
Copper	200.8	0.1	0.1	1	9/28/01	10/17/01	3.0		
Iron	6010B	20	20	1	9/28/01	10/2/01	126		
Lead	200.8	0.02	0.02	1	9/28/01	10/17/01	0.19		
Manganese	200.8	0.05	0.05	1	9/28/01	10/17/01	3.38		
Nickel	6010B	20	20	1	9/28/01	10/2/01	20	U	
Selenium	200.8	4.0	4.0	1	9/28/01	10/17/01	4.0	U	
Silver	200.8	0.02	0.02	1	9/28/01	10/17/01	0.02	U	
Thallium	200.8	0.02	0.02	1	9/28/01	10/17/01	0.02	U	
Zinc	6010B	10	10	1	9/28/01	10/2/01	10	U	

% Solids: 0.0

Comments:

00003

METALS
-1-
INORGANIC ANALYSIS DATA SHEET

Client: Arrowhead Engineering
Project No.: NA
Project Name: WR Grace-KDC Well Sampling
Matrix: WATER

Service Request: K2106919
Date Collected: 09/18/01
Date Received: 09/21/01
Units: µG/L
Basis: NA

Sample Name: MW-2
Lab Code: K2106919-002

Analyte	Analysis Method	MRL	MDL	Dil.	Date Extracted	Date Analyzed	Result	C	Q
Antimony	200.8	0.25	0.25	5	9/28/01	10/17/01	0.25	U	
Arsenic	200.8	2.5	2.5	5	9/28/01	10/17/01	28.1		
Barium	6010B	5.0	5.0	1	9/28/01	10/2/01	703		
Beryllium	200.8	0.10	0.10	5	9/28/01	10/17/01	3.12		
Cadmium	200.8	0.25	0.25	5	9/28/01	10/17/01	0.57		
Chromium	200.8	1.0	1.0	5	9/28/01	10/17/01	10.2		
Copper	200.8	0.5	0.5	5	9/28/01	10/17/01	374		
Iron	6010B	20	20	1	9/28/01	10/2/01	42100		
Lead	200.8	0.10	0.10	5	9/28/01	10/17/01	44.8		
Manganese	200.8	0.25	0.25	5	9/28/01	10/17/01	916		
Nickel	6010B	20	20	1	9/28/01	10/2/01	36.5		
Selenium	200.8	10.0	10.0	5	9/28/01	10/17/01	10.0	U	
Silver	200.8	0.10	0.10	5	9/28/01	10/17/01	0.36		
Thallium	200.8	0.10	0.10	5	9/28/01	10/17/01	0.62		
Zinc	6010B	10	10	1	9/28/01	10/2/01	204		

% Solids: 0.0

Comments:

00009

METALS

-1-

INORGANIC ANALYSIS DATA SHEET

Client: Arrowhead Engineering
Service Request: K2106919

Project No.: NA
Date Collected:

Project Name: WR Grace-KDC Well Sampling
Date Received:

Matrix: WATER
Units: µG/L

Basis: NA

Sample Name: Method Blank
Lab Code: K2106919-MB

Analyte	Analysis Method	MRL	MDL	Dil.	Date Extracted	Date Analyzed	Result	C	Q
Antimony	200.8	0.05	0.05	1	9/28/01	10/17/01	0.05	U	
Arsenic	200.8	0.5	0.5	1	9/28/01	10/17/01	0.5	U	
Barium	6010B	5.0	5.0	1	9/28/01	10/2/01	5.0	U	
Beryllium	200.8	0.02	0.02	1	9/28/01	10/17/01	0.02	U	
Cadmium	200.8	0.05	0.05	1	9/28/01	10/17/01	0.05	U	
Chromium	200.8	0.2	0.2	1	9/28/01	10/17/01	0.2	U	
Copper	200.8	0.1	0.1	1	9/28/01	10/17/01	0.1	U	
Iron	6010B	20	20	1	9/28/01	10/2/01	20	U	
Lead	200.8	0.02	0.02	1	9/28/01	10/17/01	0.02	U	
Manganese	200.8	0.05	0.05	1	9/28/01	10/17/01	0.05	U	
Nickel	6010B	20	20	1	9/28/01	10/2/01	20	U	
Selenium	200.8	4.0	4.0	1	9/28/01	10/17/01	4.0	U	
Silver	200.8	0.02	0.02	1	9/28/01	10/17/01	0.02	U	
Thallium	200.8	0.02	0.02	1	9/28/01	10/17/01	0.02	U	
Zinc	6010B	10	10	1	9/28/01	10/2/01	10	U	

% Solids: 0.0

Comments:

00010

METALS
- 5a -
SPIKE SAMPLE RECOVERY

Client: Arrowhead Engineering
Service Request: K2106919
Project No.:
Units: µG/L
Project Name: WR Grace-KDC Well Sampling
Basis: NA
Matrix: WATER
% Solids: 0.0

Sample Name: MW-1S
Lab Code: K2106919-001S

Analyte	Control Limit %R	Spike Result	C	Sample Result	C	Spike Added	%R	Q	Method
Antimony	75 - 125	20.8		0.11		20.0	103		200.8
Arsenic	75 - 125	20.0		0.5	U	20.0	100		200.8
Barium	75 - 125	2110		94.2		2000	101		6010B
Beryllium	75 - 125	16.1		0.02	U	20.0	81		200.8
Cadmium	75 - 125	19.0		0.05	U	20.0	95		200.8
Chromium	75 - 125	24.6		7.0		20.0	88		200.8
Copper	75 - 125	19.4		3.0		20.0	82		200.8
Iron	75 - 125	1120		126		1000	99		6010B
Lead	75 - 125	20.8		0.19		20.0	103		200.8
Manganese	75 - 125	20.9		3.38		20.0	88		200.8
Nickel	75 - 125	480		20.0	U	500	96		6010B
Selenium	75 - 125	22.3		4.0	U	20.0	112		200.8
Silver	75 - 125	18.1		0.02	U	20.0	91		200.8
Thallium	75 - 125	21.5		0.02	U	20.0	108		200.8
Zinc	75 - 125	500		10.0	U	500	100		6010B

Comments:

METALS
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DUPLICATES

Client: Arrowhead Engineering
Service Request: K2106919
Project No.:
Units: µG/L
Project Name: WR Grace-KDC Well Sampling
Basis: NA
Matrix: WATER
% Solids: 0.0

Sample Name: MW-1D
Lab Code: K2106919-001D

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	Method
Antimony	0.1	0.11		0.09		18		200.8
Arsenic		0.5	U	0.5	U			200.8
Barium		94.2		94.3		0		6010B
Beryllium		0.02	U	0.02	U			200.8
Cadmium		0.05	U	0.05	U			200.8
Chromium		7.0		6.6		6		200.8
Copper		3.0		2.9		4		200.8
Iron		126		116		8		6010B
Lead		0.19		0.16		20		200.8
Manganese		3.38		3.24		4		200.8
Nickel		20	U	20	U			6010B
Selenium		4.0	U	4.0	U			200.8
Silver		0.02	U	0.02	U			200.8
Thallium		0.02	U	0.02	U			200.8
Zinc		10	U	10	U			6010B

METALS

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LABORATORY CONTROL SAMPLE

Client: Arrowhead Engineering Service Request: K2106919

Project No.:

Project Name: WR Grace-KDC Well Sampling

Aqueous LCS Source: Inorganic Ventures Solid LCS Source:

Analyte	Aqueous ug/L True	Found	%R	Solid (mg/kg) True	Found	C	Limits		%R
Antimony	20.0	20.0	100						
Arsenic	20.0	20.1	101						
Barium	5000	4990	100						
Beryllium	20.0	21.0	105						
Cadmium	20.0	20.0	100						
Chromium	20.0	20.1	101						
Copper	20.0	19.9	100						
Iron	2500	2460	98						
Lead	20.0	19.8	99						
Manganese	20.0	20.0	100						
Nickel	1250	1230	98						
Selenium	20.0	19.9	100						
Silver	20.0	19.6	98						
Thallium	20.0	20.1	101						
Zinc	1250	1230	98						

Polychlorinated Biphenyls (PCBs) Method 8082

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	Arrowhead Engineering	**Service Request:**	K2106919
Project:	WR Grace-KDC Well Sampling	**Date Collected:**	09/18/2001
Sample Matrix:	Water	**Date Received:**	09/21/2001

Polychlorinated Biphenyls (PCBs)

Sample Name:	MW-1	**Units:**	ug/L
Lab Code:	K2106919-001	**Basis:**	NA
Extraction Method:	EPA 3520	**Level:**	Low
Analysis Method:	8082		

Analyte Name	Result	Q	MRL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Aroclor 1016	ND	U	0.20	1	09/24/01	10/03/01	KWG0106262	
Aroclor 1221	ND	U	0.40	1	09/24/01	10/03/01	KWG0106262	
Aroclor 1232	ND	U	0.20	1	09/24/01	10/03/01	KWG0106262	
Aroclor 1242	ND	U	0.20	1	09/24/01	10/03/01	KWG0106262	
Aroclor 1248	ND	U	0.20	1	09/24/01	10/03/01	KWG0106262	
Aroclor 1254	ND	U	0.20	1	09/24/01	10/03/01	KWG0106262	
Aroclor 1260	ND	U	0.20	1	09/24/01	10/03/01	KWG0106262	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Decachlorobiphenyl	70	0-143	10/03/01	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	Arrowhead Engineering	**Service Request:**	K2106919
Project:	WR Grace-KDC Well Sampling	**Date Collected:**	09/18/2001
Sample Matrix:	Water	**Date Received:**	09/21/2001

Polychlorinated Biphenyls (PCBs)

Sample Name:	MW-2	**Units:**	ug/L
Lab Code:	K2106919-002	**Basis:**	NA
Extraction Method:	EPA 3520	**Level:**	Low
Analysis Method:	8082		

Analyte Name	Result	Q	MRL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Aroclor 1016	ND	U	0.19	1	09/24/01	10/03/01	KWG0106262	
Aroclor 1221	ND	U	0.38	1	09/24/01	10/03/01	KWG0106262	
Aroclor 1232	ND	U	0.19	1	09/24/01	10/03/01	KWG0106262	
Aroclor 1242	ND	U	0.19	1	09/24/01	10/03/01	KWG0106262	
Aroclor 1248	ND	U	0.19	1	09/24/01	10/03/01	KWG0106262	
Aroclor 1254	ND	U	0.19	1	09/24/01	10/03/01	KWG0106262	
Aroclor 1260	ND	U	0.19	1	09/24/01	10/03/01	KWG0106262	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Decachlorobiphenyl	43	0-143	10/03/01	Acceptable

Comments:

00015

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: Arrowhead Engineering
Project: WR Grace-KDC Well Sampling
Sample Matrix: Water

Service Request: K2106919
Date Collected: NA
Date Received: NA

Polychlorinated Biphenyls (PCBs)

Sample Name: Method Blank
Lab Code: KWG0106262-4

Extraction Method: EPA 3520
Analysis Method: 8082

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Aroclor 1016	ND	U	0.20	1	09/24/01	10/03/01	KWG0106262	
Aroclor 1221	ND	U	0.40	1	09/24/01	10/03/01	KWG0106262	
Aroclor 1232	ND	U	0.20	1	09/24/01	10/03/01	KWG0106262	
Aroclor 1242	ND	U	0.20	1	09/24/01	10/03/01	KWG0106262	
Aroclor 1248	ND	U	0.20	1	09/24/01	10/03/01	KWG0106262	
Aroclor 1254	ND	U	0.20	1	09/24/01	10/03/01	KWG0106262	
Aroclor 1260	ND	U	0.20	1	09/24/01	10/03/01	KWG0106262	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Decachlorobiphenyl	57	0-143	10/03/01	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Arrowhead Engineering
Project: WR Grace-KDC Well Sampling
Sample Matrix: Water

Service Request: K2106919

Surrogate Recovery Summary
Polychlorinated Biphenyls (PCBs)

Extraction Method: EPA 3520
Analysis Method: 8082

Units: PERCENT
Level: Low

Sample Name	Lab Code	Sur1
MW-1	K2106919-001	70
MW-2	K2106919-002	43
Method Blank	KWG0106262-4	57
MW-1MS	KWG0106262-1	91
MW-1DMS	KWG0106262-2	86
Lab Control Sample	KWG0106262-3	68

Surrogate Recovery Control Limits (%)

Sur1 = Decachlorobiphenyl 0-143

Results flagged with an asterisk (*) indicate values outside control criteria.
Results flagged with a pound (#) indicate the control criteria is not applicable.

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	Arrowhead Engineering	**Service Request:**	K2106919
Project:	WR Grace-KDC Well Sampling	**Date Extracted:**	09/24/2001
Sample Matrix:	Water	**Date Analyzed:**	10/03/2001

Matrix Spike/Duplicate Matrix Spike Summary
Polychlorinated Biphenyls (PCBs)

Sample Name:	MW-1	**Units:**	ug/L
Lab Code:	K2106919-001	**Basis:**	NA
Extraction Method:	EPA 3520	**Level:**	Low
Analysis Method:	8082	**Extraction Lot:**	KWG0106262

		MW-1MS KWG0106262-1 Matrix Spike			MW-1DMS KWG0106262-2 Duplicate Matrix Spike					
Analyte Name	**Sample Result**	**Result**	**Expected**	**%Rec**	**Result**	**Expected**	**%Rec**	**%Rec Limits**	**RPD**	**RPD Limit**
Aroclor 1016	ND	4.35	4.44	98	3.91	4.44	88	48-140	11	30
Aroclor 1260	ND	4.25	4.44	96	3.80	4.44	85	58-136	11	30

Results flagged with an asterisk (*) indicate values outside control criteria.
Results flagged with a pound (#) indicate the control criteria is not applicable.
Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	Arrowhead Engineering	**Service Request:**	K2106919
Project:	WR Grace-KDC Well Sampling	**Date Extracted:**	09/24/2001
Sample Matrix:	Water	**Date Analyzed:**	10/03/2001

Lab Control Spike Summary
Polychlorinated Biphenyls (PCBs)

Extraction Method:	EPA 3520	**Units:**	ug/L
Analysis Method:	8082	**Basis:**	NA
		Level:	Low
		Extraction Lot:	KWG0106262

	Lab Control Sample KWG0106262-3 Lab Control Spike			
Analyte Name	**Result**	**Expected**	**%Rec**	**%Rec Limits**
Aroclor 1016	2.04	2.00	102	60-124
Aroclor 1260	2.02	2.00	101	65-131

Results flagged with an asterisk (*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Volatile Organic Compounds
Method 8260 B

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: Arrowhead Engineering
Project: WR Grace-KDC Well Sampling
Sample Matrix: Water

Service Request: K2106919
Date Collected: 09/18/2001
Date Received: 09/21/2001

Volatile Organic Compounds

Sample Name: MW-1
Lab Code: K2106919-001

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dichlorodifluoromethane	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
Chloromethane	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
Vinyl Chloride	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
Bromomethane	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
Chloroethane	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
Trichlorofluoromethane	**0.60**		0.50	1	09/28/01	09/28/01	KWG0106350	
Acetone	ND	U	20	1	09/28/01	09/28/01	KWG0106350	
1,1-Dichloroethene	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
Carbon Disulfide	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
Methylene Chloride	ND	U	1.0	1	09/28/01	09/28/01	KWG0106350	
trans-1,2-Dichloroethene	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
1,1-Dichloroethane	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
2-Butanone (MEK)	ND	U	20	1	09/28/01	09/28/01	KWG0106350	
2,2-Dichloropropane	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
cis-1,2-Dichloroethene	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
Chloroform	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
Bromochloromethane	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
1,1-Dichloropropene	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
Carbon Tetrachloride	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
1,2-Dichloroethane (EDC)	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
Benzene	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
Trichloroethene (TCE)	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
1,2-Dichloropropane	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
Bromodichloromethane	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
Dibromomethane	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
2-Hexanone	ND	U	20	1	09/28/01	09/28/01	KWG0106350	
cis-1,3-Dichloropropene	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
Toluene	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
trans-1,3-Dichloropropene	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
1,1,2-Trichloroethane	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
4-Methyl-2-pentanone (MIBK)	ND	U	20	1	09/28/01	09/28/01	KWG0106350	
1,3-Dichloropropane	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
Tetrachloroethene (PCE)	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
Dibromochloromethane	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	

Comments:

Client: Arrowhead Engineering
Project: WR Grace-KDC Well Sampling
Sample Matrix: Water

Service Request: K2106919
Date Collected: 09/18/2001
Date Received: 09/21/2001

Volatile Organic Compounds

Sample Name: MW-1
Lab Code: K2106919-001

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,2-Dibromoethane (EDB)	ND	U	2.0	1	09/28/01	09/28/01	KWG0106350	
Chlorobenzene	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
1,1,1,2-Tetrachloroethane	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
Ethylbenzene	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
m,p-Xylenes	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
o-Xylene	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
Styrene	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
Bromoform	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
Isopropylbenzene	ND	U	2.0	1	09/28/01	09/28/01	KWG0106350	
1,1,2,2-Tetrachloroethane	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
1,2,3-Trichloropropane	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
Bromobenzene	ND	U	2.0	1	09/28/01	09/28/01	KWG0106350	
n-Propylbenzene	ND	U	2.0	1	09/28/01	09/28/01	KWG0106350	
2-Chlorotoluene	ND	U	2.0	1	09/28/01	09/28/01	KWG0106350	
4-Chlorotoluene	ND	U	2.0	1	09/28/01	09/28/01	KWG0106350	
1,3,5-Trimethylbenzene	ND	U	2.0	1	09/28/01	09/28/01	KWG0106350	
tert-Butylbenzene	ND	U	2.0	1	09/28/01	09/28/01	KWG0106350	
1,2,4-Trimethylbenzene	ND	U	2.0	1	09/28/01	09/28/01	KWG0106350	
sec-Butylbenzene	ND	U	2.0	1	09/28/01	09/28/01	KWG0106350	
1,3-Dichlorobenzene	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
4-Isopropyltoluene	ND	U	2.0	1	09/28/01	09/28/01	KWG0106350	
1,4-Dichlorobenzene	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
n-Butylbenzene	ND	U	2.0	1	09/28/01	09/28/01	KWG0106350	
1,2-Dichlorobenzene	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
1,2-Dibromo-3-chloropropane	ND	U	2.0	1	09/28/01	09/28/01	KWG0106350	
1,2,4-Trichlorobenzene	ND	U	2.0	1	09/28/01	09/28/01	KWG0106350	
1,2,3-Trichlorobenzene	ND	U	2.0	1	09/28/01	09/28/01	KWG0106350	
Naphthalene	ND	U	2.0	1	09/28/01	09/28/01	KWG0106350	
Hexachlorobutadiene	ND	U	2.0	1	09/28/01	09/28/01	KWG0106350	

Comments:

00021

Client:	Arrowhead Engineering	**Service Request:**	K2106919
Project:	WR Grace-KDC Well Sampling	**Date Collected:**	09/18/2001
Sample Matrix:	Water	**Date Received:**	09/21/2001

Volatile Organic Compounds

Sample Name:	MW-1	**Units:**	ug/L
Lab Code:	K2106919-001	**Basis:**	NA

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	96	87-115	09/28/01	Acceptable
Toluene-d8	98	83-116	09/28/01	Acceptable
4-Bromofluorobenzene	95	75-120	09/28/01	Acceptable

Comments:

Client: Arrowhead Engineering
Project: WR Grace-KDC Well Sampling
Sample Matrix: Water

Service Request: K2106919
Date Collected: 09/18/2001
Date Received: 09/21/2001

Volatile Organic Compounds

Sample Name: MW-2
Lab Code: K2106919-002

Units: ug/L
Basis: NA

Extraction Method: EPA 5030B
Analysis Method: 8260B

Level: Low

Analyte Name	Result	Q	MRL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dichlorodifluoromethane	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
Chloromethane	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
Vinyl Chloride	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
Bromomethane	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
Chloroethane	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
Trichlorofluoromethane	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
Acetone	ND	U	20	1	09/28/01	09/28/01	KWG0106350	
1,1-Dichloroethene	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
Carbon Disulfide	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
Methylene Chloride	ND	U	1.0	1	09/28/01	09/28/01	KWG0106350	
trans-1,2-Dichloroethene	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
1,1-Dichloroethane	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
2-Butanone (MEK)	ND	U	20	1	09/28/01	09/28/01	KWG0106350	
2,2-Dichloropropane	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
cis-1,2-Dichloroethene	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
Chloroform	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
Bromochloromethane	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
1,1-Dichloropropene	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
Carbon Tetrachloride	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
1,2-Dichloroethane (EDC)	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
Benzene	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
Trichloroethene (TCE)	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
1,2-Dichloropropane	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
Bromodichloromethane	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
Dibromomethane	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
2-Hexanone	ND	U	20	1	09/28/01	09/28/01	KWG0106350	
cis-1,3-Dichloropropene	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
Toluene	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
trans-1,3-Dichloropropene	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
1,1,2-Trichloroethane	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
4-Methyl-2-pentanone (MIBK)	ND	U	20	1	09/28/01	09/28/01	KWG0106350	
1,3-Dichloropropane	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
Tetrachloroethene (PCE)	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
Dibromochloromethane	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	

Comments:

Client: Arrowhead Engineering
Project: WR Grace-KDC Well Sampling
Sample Matrix: Water

Service Request: K2106919
Date Collected: 09/18/2001
Date Received: 09/21/2001

Volatile Organic Compounds

Sample Name: MW-2
Lab Code: K2106919-002

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,2-Dibromoethane (EDB)	ND	U	2.0	1	09/28/01	09/28/01	KWG0106350	
Chlorobenzene	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
1,1,1,2-Tetrachloroethane	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
Ethylbenzene	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
m,p-Xylenes	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
o-Xylene	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
Styrene	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
Bromoform	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
Isopropylbenzene	ND	U	2.0	1	09/28/01	09/28/01	KWG0106350	
1,1,2,2-Tetrachloroethane	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
1,2,3-Trichloropropane	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
Bromobenzene	ND	U	2.0	1	09/28/01	09/28/01	KWG0106350	
n-Propylbenzene	ND	U	2.0	1	09/28/01	09/28/01	KWG0106350	
2-Chlorotoluene	ND	U	2.0	1	09/28/01	09/28/01	KWG0106350	
4-Chlorotoluene	ND	U	2.0	1	09/28/01	09/28/01	KWG0106350	
1,3,5-Trimethylbenzene	ND	U	2.0	1	09/28/01	09/28/01	KWG0106350	
tert-Butylbenzene	ND	U	2.0	1	09/28/01	09/28/01	KWG0106350	
1,2,4-Trimethylbenzene	ND	U	2.0	1	09/28/01	09/28/01	KWG0106350	
sec-Butylbenzene	ND	U	2.0	1	09/28/01	09/28/01	KWG0106350	
1,3-Dichlorobenzene	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
4-Isopropyltoluene	ND	U	2.0	1	09/28/01	09/28/01	KWG0106350	
1,4-Dichlorobenzene	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
n-Butylbenzene	ND	U	2.0	1	09/28/01	09/28/01	KWG0106350	
1,2-Dichlorobenzene	ND	U	0.50	1	09/28/01	09/28/01	KWG0106350	
1,2-Dibromo-3-chloropropane	ND	U	2.0	1	09/28/01	09/28/01	KWG0106350	
1,2,4-Trichlorobenzene	ND	U	2.0	1	09/28/01	09/28/01	KWG0106350	
1,2,3-Trichlorobenzene	ND	U	2.0	1	09/28/01	09/28/01	KWG0106350	
Naphthalene	ND	U	2.0	1	09/28/01	09/28/01	KWG0106350	
Hexachlorobutadiene	ND	U	2.0	1	09/28/01	09/28/01	KWG0106350	

Comments:

Analytical Results

Client:	Arrowhead Engineering	**Service Request:**	K2106919
Project:	WR Grace-KDC Well Sampling	**Date Collected:**	09/18/2001
Sample Matrix:	Water	**Date Received:**	09/21/2001

Volatile Organic Compounds

Sample Name:	MW-2	**Units:**	ug/L
Lab Code:	K2106919-002	**Basis:**	NA

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	96	87-115	09/28/01	Acceptable
Toluene-d8	98	83-116	09/28/01	Acceptable
4-Bromofluorobenzene	95	75-120	09/28/01	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: Arrowhead Engineering
Project: WR Grace-KDC Well Sampling
Sample Matrix: Water

Service Request: K2106919
Date Collected: NA
Date Received: NA

Volatile Organic Compounds

Sample Name: Method Blank
Lab Code: KWG0106350-4

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dichlorodifluoromethane	ND	U	0.50	1	09/27/01	09/27/01	KWG0106350	
Chloromethane	ND	U	0.50	1	09/27/01	09/27/01	KWG0106350	
Vinyl Chloride	ND	U	0.50	1	09/27/01	09/27/01	KWG0106350	
Bromomethane	ND	U	0.50	1	09/27/01	09/27/01	KWG0106350	
Chloroethane	ND	U	0.50	1	09/27/01	09/27/01	KWG0106350	
Trichlorofluoromethane	ND	U	0.50	1	09/27/01	09/27/01	KWG0106350	
Acetone	ND	U	20	1	09/27/01	09/27/01	KWG0106350	
1,1-Dichloroethene	ND	U	0.50	1	09/27/01	09/27/01	KWG0106350	
Carbon Disulfide	ND	U	0.50	1	09/27/01	09/27/01	KWG0106350	
Methylene Chloride	ND	U	1.0	1	09/27/01	09/27/01	KWG0106350	
trans-1,2-Dichloroethene	ND	U	0.50	1	09/27/01	09/27/01	KWG0106350	
1,1-Dichloroethane	ND	U	0.50	1	09/27/01	09/27/01	KWG0106350	
2-Butanone (MEK)	ND	U	20	1	09/27/01	09/27/01	KWG0106350	
2,2-Dichloropropane	ND	U	0.50	1	09/27/01	09/27/01	KWG0106350	
cis-1,2-Dichloroethene	ND	U	0.50	1	09/27/01	09/27/01	KWG0106350	
Chloroform	ND	U	0.50	1	09/27/01	09/27/01	KWG0106350	
Bromochloromethane	ND	U	0.50	1	09/27/01	09/27/01	KWG0106350	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	1	09/27/01	09/27/01	KWG0106350	
1,1-Dichloropropene	ND	U	0.50	1	09/27/01	09/27/01	KWG0106350	
Carbon Tetrachloride	ND	U	0.50	1	09/27/01	09/27/01	KWG0106350	
1,2-Dichloroethane (EDC)	ND	U	0.50	1	09/27/01	09/27/01	KWG0106350	
Benzene	ND	U	0.50	1	09/27/01	09/27/01	KWG0106350	
Trichloroethene (TCE)	ND	U	0.50	1	09/27/01	09/27/01	KWG0106350	
1,2-Dichloropropane	ND	U	0.50	1	09/27/01	09/27/01	KWG0106350	
Bromodichloromethane	ND	U	0.50	1	09/27/01	09/27/01	KWG0106350	
Dibromomethane	ND	U	0.50	1	09/27/01	09/27/01	KWG0106350	
2-Hexanone	ND	U	20	1	09/27/01	09/27/01	KWG0106350	
cis-1,3-Dichloropropene	ND	U	0.50	1	09/27/01	09/27/01	KWG0106350	
Toluene	ND	U	0.50	1	09/27/01	09/27/01	KWG0106350	
trans-1,3-Dichloropropene	ND	U	0.50	1	09/27/01	09/27/01	KWG0106350	
1,1,2-Trichloroethane	ND	U	0.50	1	09/27/01	09/27/01	KWG0106350	
4-Methyl-2-pentanone (MIBK)	ND	U	20	1	09/27/01	09/27/01	KWG0106350	
1,3-Dichloropropane	ND	U	0.50	1	09/27/01	09/27/01	KWG0106350	
Tetrachloroethene (PCE)	ND	U	0.50	1	09/27/01	09/27/01	KWG0106350	
Dibromochloromethane	ND	U	0.50	1	09/27/01	09/27/01	KWG0106350	

Comments:

Client: Arrowhead Engineering
Project: WR Grace-KDC Well Sampling
Sample Matrix: Water

Service Request: K2106919
Date Collected: NA
Date Received: NA

Volatile Organic Compounds

Sample Name: Method Blank
Lab Code: KWG0106350-4

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,2-Dibromoethane (EDB)	ND	U	2.0	1	09/27/01	09/27/01	KWG0106350	
Chlorobenzene	ND	U	0.50	1	09/27/01	09/27/01	KWG0106350	
1,1,1,2-Tetrachloroethane	ND	U	0.50	1	09/27/01	09/27/01	KWG0106350	
Ethylbenzene	ND	U	0.50	1	09/27/01	09/27/01	KWG0106350	
m,p-Xylenes	ND	U	0.50	1	09/27/01	09/27/01	KWG0106350	
o-Xylene	ND	U	0.50	1	09/27/01	09/27/01	KWG0106350	
Styrene	ND	U	0.50	1	09/27/01	09/27/01	KWG0106350	
Bromoform	ND	U	0.50	1	09/27/01	09/27/01	KWG0106350	
Isopropylbenzene	ND	U	2.0	1	09/27/01	09/27/01	KWG0106350	
1,1,2,2-Tetrachloroethane	ND	U	0.50	1	09/27/01	09/27/01	KWG0106350	
1,2,3-Trichloropropane	ND	U	0.50	1	09/27/01	09/27/01	KWG0106350	
Bromobenzene	ND	U	2.0	1	09/27/01	09/27/01	KWG0106350	
n-Propylbenzene	ND	U	2.0	1	09/27/01	09/27/01	KWG0106350	
2-Chlorotoluene	ND	U	2.0	1	09/27/01	09/27/01	KWG0106350	
4-Chlorotoluene	ND	U	2.0	1	09/27/01	09/27/01	KWG0106350	
1,3,5-Trimethylbenzene	ND	U	2.0	1	09/27/01	09/27/01	KWG0106350	
tert-Butylbenzene	ND	U	2.0	1	09/27/01	09/27/01	KWG0106350	
1,2,4-Trimethylbenzene	ND	U	2.0	1	09/27/01	09/27/01	KWG0106350	
sec-Butylbenzene	ND	U	2.0	1	09/27/01	09/27/01	KWG0106350	
1,3-Dichlorobenzene	ND	U	0.50	1	09/27/01	09/27/01	KWG0106350	
4-Isopropyltoluene	ND	U	2.0	1	09/27/01	09/27/01	KWG0106350	
1,4-Dichlorobenzene	ND	U	0.50	1	09/27/01	09/27/01	KWG0106350	
n-Butylbenzene	ND	U	2.0	1	09/27/01	09/27/01	KWG0106350	
1,2-Dichlorobenzene	ND	U	0.50	1	09/27/01	09/27/01	KWG0106350	
1,2-Dibromo-3-chloropropane	ND	U	2.0	1	09/27/01	09/27/01	KWG0106350	
1,2,4-Trichlorobenzene	ND	U	2.0	1	09/27/01	09/27/01	KWG0106350	
1,2,3-Trichlorobenzene	ND	U	2.0	1	09/27/01	09/27/01	KWG0106350	
Naphthalene	ND	U	2.0	1	09/27/01	09/27/01	KWG0106350	
Hexachlorobutadiene	ND	U	2.0	1	09/27/01	09/27/01	KWG0106350	

Comments:

Client:	Arrowhead Engineering	**Service Request:**	K2106919
Project:	WR Grace-KDC Well Sampling	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

Volatile Organic Compounds

Sample Name:	Method Blank	**Units:**	ug/L
Lab Code:	KWG0106350-4	**Basis:**	NA

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	94	87-115	09/27/01	Acceptable
Toluene-d8	99	83-116	09/27/01	Acceptable
4-Bromofluorobenzene	97	75-120	09/27/01	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Arrowhead Engineering
Project: WR Grace-KDC Well Sampling
Sample Matrix: Water

Service Request: K2106919

Surrogate Recovery Summary
Volatile Organic Compounds

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: PERCENT
Level: Low

Sample Name	Lab Code	Sur1	Sur2	Sur3
MW-1	K2106919-001	96	98	95
MW-2	K2106919-002	96	98	95
Method Blank	KWG0106350-4	94	99	97
Batch QC	K2106864-003	96	99	95
Batch QCMS	KWG0106350-1	98	102	99
Batch QCDMS	KWG0106350-2	97	99	100
Lab Control Sample	KWG0106350-3	95	101	98

Surrogate Recovery Control Limits (%)

Sur1 = Dibromofluoromethane	87-115
Sur2 = Toluene-d8	83-116
Sur3 = 4-Bromofluorobenzene	75-120

Results flagged with an asterisk (*) indicate values outside control criteria.
Results flagged with a pound (#) indicate the control criteria is not applicable.

00020

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	Arrowhead Engineering	**Service Request:**	K2106919
Project:	WR Grace-KDC Well Sampling	**Date Extracted:**	09/27/2001
Sample Matrix:	Water	**Date Analyzed:**	09/27/2001

Matrix Spike/Duplicate Matrix Spike Summary
Volatile Organic Compounds

Sample Name:	Batch QC	**Units:**	ug/L
Lab Code:	K2106864-003	**Basis:**	NA
Extraction Method:	EPA 5030B	**Level:**	Low
Analysis Method:	8260B	**Extraction Lot:**	KWG0106350

		Batch QCMS KWG0106350-1 Matrix Spike			Batch QCDMS KWG0106350-2 Duplicate Matrix Spike					
Analyte Name	**Sample Result**	**Result**	**Expected**	**%Rec**	**Result**	**Expected**	**%Rec**	**%Rec Limits**	**RPD**	**RPD Limit**
1,1-Dichloroethene	ND	10.9	10.0	109	10.1	10.0	101	42-178	8	30
Benzene	ND	10.0	10.0	100	9.36	10.0	94	65-138	7	30
Trichloroethene (TCE)	ND	10.2	10.0	102	9.58	10.0	96	58-146	6	30
Toluene	ND	10.0	10.0	100	9.55	10.0	95	68-135	5	30
Chlorobenzene	ND	10.1	10.0	101	9.76	10.0	98	71-124	3	30
1,2-Dichlorobenzene	ND	9.63	10.0	96	9.46	10.0	95	71-121	2	30
Naphthalene	ND	11.7	10.0	117	11.8	10.0	118	50-145	1	30

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	Arrowhead Engineering	**Service Request:**	K2106919
Project:	WR Grace-KDC Well Sampling	**Date Extracted:**	09/27/2001
Sample Matrix:	Water	**Date Analyzed:**	09/27/2001

Lab Control Spike Summary
Volatile Organic Compounds

Extraction Method:	EPA 5030B	**Units:**	ug/L
Analysis Method:	8260B	**Basis:**	NA
		Level:	Low
		Extraction Lot:	KWG0106350

	Lab Control Sample KWG0106350-3 Lab Control Spike			
Analyte Name	**Result**	**Expected**	**%Rec**	**%Rec Limits**
Dichlorodifluoromethane	13.3	10.0	133	50-150
Chloromethane	10.1	10.0	101	50-150
Vinyl Chloride	11.3	10.0	113	50-150
Bromomethane	10.2	10.0	102	50-150
Chloroethane	10.2	10.0	102	50-150
Trichlorofluoromethane	9.03	10.0	90	50-150
Acetone	46.2	50.0	92	50-150
1,1-Dichloroethene	9.77	10.0	98	62-148
Carbon Disulfide	16.7	20.0	83	50-150
Methylene Chloride	9.47	10.0	95	50-150
trans-1,2-Dichloroethene	9.86	10.0	99	50-150
1,1-Dichloroethane	9.71	10.0	97	50-150
2-Butanone (MEK)	53.1	50.0	106	50-150
2,2-Dichloropropane	9.97	10.0	100	50-150
cis-1,2-Dichloroethene	9.67	10.0	97	50-150
Chloroform	8.85	10.0	88	50-150
Bromochloromethane	9.20	10.0	92	50-150
1,1,1-Trichloroethane (TCA)	9.13	10.0	91	50-150
1,1-Dichloropropene	9.60	10.0	96	50-150
Carbon Tetrachloride	9.28	10.0	93	50-150
1,2-Dichloroethane (EDC)	8.87	10.0	89	50-150
Benzene	9.36	10.0	94	77-114
Trichloroethene (TCE)	9.46	10.0	95	69-124
1,2-Dichloropropane	9.20	10.0	92	50-150
Bromodichloromethane	8.72	10.0	87	50-150
Dibromomethane	9.17	10.0	92	50-150
2-Hexanone	49.4	50.0	99	50-150
cis-1,3-Dichloropropene	10.2	10.0	102	50-150
Toluene	9.50	10.0	95	75-118
trans-1,3-Dichloropropene	9.55	10.0	95	50-150
1,1,2-Trichloroethane	9.42	10.0	94	50-150
4-Methyl-2-pentanone (MIBK)	54.2	50.0	108	50-150
1,3-Dichloropropane	9.10	10.0	91	50-150
Tetrachloroethene (PCE)	9.63	10.0	96	50-150
Dibromochloromethane	8.72	10.0	87	50-150

Results flagged with an asterisk (*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

00931

Client: Arrowhead Engineering
Project: WR Grace-KDC Well Sampling
Sample Matrix: Water

Service Request: K2106919
Date Extracted: 09/27/2001
Date Analyzed: 09/27/2001

Lab Control Spike Summary
Volatile Organic Compounds

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA
Level: Low
Extraction Lot: KWG0106350

	Lab Control Sample KWG0106350-3 Lab Control Spike			
Analyte Name	**Result**	**Expected**	**%Rec**	**%Rec Limits**
1,2-Dibromoethane (EDB)	9.36	10.0	94	50-150
Chlorobenzene	9.58	10.0	96	79-110
1,1,1,2-Tetrachloroethane	9.80	10.0	98	50-150
Ethylbenzene	10.1	10.0	101	50-150
m,p-Xylenes	20.7	20.0	103	50-150
o-Xylene	10.3	10.0	103	50-150
Styrene	9.90	10.0	99	50-150
Bromoform	9.20	10.0	92	50-150
Isopropylbenzene	10.2	10.0	102	50-150
1,1,2,2-Tetrachloroethane	9.20	10.0	92	50-150
1,2,3-Trichloropropane	9.14	10.0	91	50-150
Bromobenzene	9.60	10.0	96	50-150
n-Propylbenzene	10.0	10.0	100	50-150
2-Chlorotoluene	9.37	10.0	94	50-150
4-Chlorotoluene	9.75	10.0	97	50-150
1,3,5-Trimethylbenzene	10.4	10.0	104	50-150
tert-Butylbenzene	10.5	10.0	105	50-150
1,2,4-Trimethylbenzene	10.7	10.0	107	50-150
sec-Butylbenzene	10.7	10.0	107	50-150
1,3-Dichlorobenzene	9.95	10.0	99	50-150
4-Isopropyltoluene	10.3	10.0	103	50-150
1,4-Dichlorobenzene	9.56	10.0	96	50-150
n-Butylbenzene	10.1	10.0	101	50-150
1,2-Dichlorobenzene	9.49	10.0	95	80-110
1,2-Dibromo-3-chloropropane	9.05	10.0	90	50-150
1,2,4-Trichlorobenzene	9.71	10.0	97	50-150
1,2,3-Trichlorobenzene	9.57	10.0	96	50-150
Naphthalene	10.7	10.0	107	64-125
Hexachlorobutadiene	8.82	10.0	88	50-150

Results flagged with an asterisk (*) indicate values outside control criteria.
Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

0n632

Semi-Volatile Organic Compounds by GC / MS
Method 8270 C

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	Arrowhead Engineering	**Service Request:**	K2106919
Project:	WR Grace-KDC Well Sampling	**Date Collected:**	09/18/2001
Sample Matrix:	Water	**Date Received:**	09/21/2001

Semi-Volatile Organic Compounds by GC/MS

Sample Name:	MW-1	**Units:**	ug/L
Lab Code:	K2106919-001	**Basis:**	NA
Extraction Method:	EPA 3520C	**Level:**	Low
Analysis Method:	8270C		

Analyte Name	Result	Q	MRL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Bis(2-chloroethyl) Ether	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
Phenol	ND	U	0.49	1	09/24/01	09/28/01	KWG0106136	
2-Chlorophenol	ND	U	0.49	1	09/24/01	09/28/01	KWG0106136	
1,3-Dichlorobenzene	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
1,4-Dichlorobenzene	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
1,2-Dichlorobenzene	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
Benzyl Alcohol	ND	U	4.9	1	09/24/01	09/28/01	KWG0106136	
Bis(2-chloroisopropyl) Ether	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
2-Methylphenol	ND	U	0.49	1	09/24/01	09/28/01	KWG0106136	
Hexachloroethane	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
N-Nitrosodi-n-propylamine	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
4-Methylphenol†	ND	U	0.49	1	09/24/01	09/28/01	KWG0106136	
Nitrobenzene	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
Isophorone	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
2-Nitrophenol	ND	U	0.49	1	09/24/01	09/28/01	KWG0106136	
2,4-Dimethylphenol	ND	U	2.0	1	09/24/01	09/28/01	KWG0106136	
Bis(2-chloroethoxy)methane	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
2,4-Dichlorophenol	ND	U	0.49	1	09/24/01	09/28/01	KWG0106136	
Benzoic Acid	ND	U	4.9	1	09/24/01	09/28/01	KWG0106136	
1,2,4-Trichlorobenzene	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
Naphthalene	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
4-Chloroaniline	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
Hexachlorobutadiene	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
4-Chloro-3-methylphenol	ND	U	0.96	1	09/24/01	09/28/01	KWG0106136	
2-Methylnaphthalene	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
Hexachlorocyclopentadiene	ND	U	0.97	1	09/24/01	09/28/01	KWG0106136	
2,4,6-Trichlorophenol	ND	U	0.49	1	09/24/01	09/28/01	KWG0106136	
2,4,5-Trichlorophenol	ND	U	0.49	1	09/24/01	09/28/01	KWG0106136	
2-Chloronaphthalene	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
2-Nitroaniline	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
Acenaphthylene	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
Dimethyl Phthalate	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
2,6-Dinitrotoluene	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
Acenaphthene	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
3-Nitroaniline	ND	U	0.97	1	09/24/01	09/28/01	KWG0106136	

Comments:

Client: Arrowhead Engineering
Project: WR Grace-KDC Well Sampling
Sample Matrix: Water

Service Request: K2106919
Date Collected: 09/18/2001
Date Received: 09/21/2001

Semi-Volatile Organic Compounds by GC/MS

Sample Name: MW-1
Lab Code: K2106919-001

Extraction Method: EPA 3520C
Analysis Method: 8270C

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
2,4-Dinitrophenol	ND	U	3.9	1	09/24/01	09/28/01	KWG0106136	
Dibenzofuran	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
4-Nitrophenol	ND	U	2.0	1	09/24/01	09/28/01	KWG0106136	
2,4-Dinitrotoluene	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
Fluorene	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
4-Chlorophenyl Phenyl Ether	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
Diethyl Phthalate	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
4-Nitroaniline	ND	U	0.97	1	09/24/01	09/28/01	KWG0106136	
2-Methyl-4,6-dinitrophenol	ND	U	2.0	1	09/24/01	09/28/01	KWG0106136	
N-Nitrosodiphenylamine	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
4-Bromophenyl Phenyl Ether	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
Hexachlorobenzene	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
Pentachlorophenol	ND	U	1.9	1	09/24/01	09/28/01	KWG0106136	
Phenanthrene	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
Anthracene	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
Di-n-butyl Phthalate	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
Fluoranthene	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
Pyrene	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
Butyl Benzyl Phthalate	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
3,3'-Dichlorobenzidine	ND	U	2.0	1	09/24/01	09/28/01	KWG0106136	
Benz(a)anthracene	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
Chrysene	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
Bis(2-ethylhexyl) Phthalate	ND	U	2.0	1	09/24/01	09/28/01	KWG0106136	
Di-n-octyl Phthalate	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
Benzo(b)fluoranthene	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
Benzo(k)fluoranthene	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
Benzo(a)pyrene	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
Indeno(1,2,3-cd)pyrene	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
Dibenz(a,h)anthracene	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
Benzo(g,h,i)perylene	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	

Comments:

U0034

Client: Arrowhead Engineering
Project: WR Grace-KDC Well Sampling
Sample Matrix: Water

Service Request: K2106919
Date Collected: 09/18/2001
Date Received: 09/21/2001

Semi-Volatile Organic Compounds by GC/MS

Sample Name: MW-1
Lab Code: K2106919-001

Units: ug/L
Basis: NA

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
2-Fluorophenol	72	21-110	09/28/01	Acceptable
Phenol-d6	73	10-110	09/28/01	Acceptable
Nitrobenzene-d5	74	35-114	09/28/01	Acceptable
2-Fluorobiphenyl	71	43-116	09/28/01	Acceptable
2,4,6-Tribromophenol	107	10-123	09/28/01	Acceptable
Terphenyl-d14	117	30-120	09/28/01	Acceptable

Analyte Comments

4-Methylphenol	This analyte cannot be separated from 3-Methylphenol.

Comments:

0035

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: Arrowhead Engineering
Project: WR Grace-KDC Well Sampling
Sample Matrix: Water

Service Request: K2106919
Date Collected: 09/18/2001
Date Received: 09/21/2001

Semi-Volatile Organic Compounds by GC/MS

Sample Name: MW-2
Lab Code: K2106919-002

Extraction Method: EPA 3520C
Analysis Method: 8270C

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Bis(2-chloroethyl) Ether	ND	U	0.21	1	09/24/01	09/28/01	KWG0106136	
Phenol	ND	U	0.52	1	09/24/01	09/28/01	KWG0106136	
2-Chlorophenol	ND	U	0.52	1	09/24/01	09/28/01	KWG0106136	
1,3-Dichlorobenzene	ND	U	0.21	1	09/24/01	09/28/01	KWG0106136	
1,4-Dichlorobenzene	ND	U	0.21	1	09/24/01	09/28/01	KWG0106136	
1,2-Dichlorobenzene	ND	U	0.21	1	09/24/01	09/28/01	KWG0106136	
Benzyl Alcohol	ND	U	5.2	1	09/24/01	09/28/01	KWG0106136	
Bis(2-chloroisopropyl) Ether	ND	U	0.21	1	09/24/01	09/28/01	KWG0106136	
2-Methylphenol	ND	U	0.52	1	09/24/01	09/28/01	KWG0106136	
Hexachloroethane	ND	U	0.21	1	09/24/01	09/28/01	KWG0106136	
N-Nitrosodi-n-propylamine	ND	U	0.21	1	09/24/01	09/28/01	KWG0106136	
4-Methylphenol†	ND	U	0.52	1	09/24/01	09/28/01	KWG0106136	
Nitrobenzene	ND	U	0.21	1	09/24/01	09/28/01	KWG0106136	
Isophorone	ND	U	0.21	1	09/24/01	09/28/01	KWG0106136	
2-Nitrophenol	ND	U	0.52	1	09/24/01	09/28/01	KWG0106136	
2,4-Dimethylphenol	ND	U	2.1	1	09/24/01	09/28/01	KWG0106136	
Bis(2-chloroethoxy)methane	ND	U	0.21	1	09/24/01	09/28/01	KWG0106136	
2,4-Dichlorophenol	ND	U	0.52	1	09/24/01	09/28/01	KWG0106136	
Benzoic Acid	ND	U	5.2	1	09/24/01	09/28/01	KWG0106136	
1,2,4-Trichlorobenzene	ND	U	0.21	1	09/24/01	09/28/01	KWG0106136	
Naphthalene	ND	U	0.21	1	09/24/01	09/28/01	KWG0106136	
4-Chloroaniline	ND	U	0.21	1	09/24/01	09/28/01	KWG0106136	
Hexachlorobutadiene	ND	U	0.21	1	09/24/01	09/28/01	KWG0106136	
4-Chloro-3-methylphenol	ND	U	1.0	1	09/24/01	09/28/01	KWG0106136	
2-Methylnaphthalene	ND	U	0.21	1	09/24/01	09/28/01	KWG0106136	
Hexachlorocyclopentadiene	ND	U	1.1	1	09/24/01	09/28/01	KWG0106136	
2,4,6-Trichlorophenol	ND	U	0.52	1	09/24/01	09/28/01	KWG0106136	
2,4,5-Trichlorophenol	ND	U	0.52	1	09/24/01	09/28/01	KWG0106136	
2-Chloronaphthalene	ND	U	0.21	1	09/24/01	09/28/01	KWG0106136	
2-Nitroaniline	ND	U	0.21	1	09/24/01	09/28/01	KWG0106136	
Acenaphthylene	ND	U	0.21	1	09/24/01	09/28/01	KWG0106136	
Dimethyl Phthalate	ND	U	0.21	1	09/24/01	09/28/01	KWG0106136	
2,6-Dinitrotoluene	ND	U	0.21	1	09/24/01	09/28/01	KWG0106136	
Acenaphthene	ND	U	0.21	1	09/24/01	09/28/01	KWG0106136	
3-Nitroaniline	ND	U	1.1	1	09/24/01	09/28/01	KWG0106136	

Comments:

00036

Client: Arrowhead Engineering
Project: WR Grace-KDC Well Sampling
Sample Matrix: Water

Service Request: K2106919
Date Collected: 09/18/2001
Date Received: 09/21/2001

Semi-Volatile Organic Compounds by GC/MS

Sample Name: MW-2
Lab Code: K2106919-002

Extraction Method: EPA 3520C
Analysis Method: 8270C

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
2,4-Dinitrophenol	ND	U	4.2	1	09/24/01	09/28/01	KWG0106136	
Dibenzofuran	ND	U	0.21	1	09/24/01	09/28/01	KWG0106136	
4-Nitrophenol	ND	U	2.1	1	09/24/01	09/28/01	KWG0106136	
2,4-Dinitrotoluene	ND	U	0.21	1	09/24/01	09/28/01	KWG0106136	
Fluorene	ND	U	0.21	1	09/24/01	09/28/01	KWG0106136	
4-Chlorophenyl Phenyl Ether	ND	U	0.21	1	09/24/01	09/28/01	KWG0106136	
Diethyl Phthalate	ND	U	0.21	1	09/24/01	09/28/01	KWG0106136	
4-Nitroaniline	ND	U	1.1	1	09/24/01	09/28/01	KWG0106136	
2-Methyl-4,6-dinitrophenol	ND	U	2.1	1	09/24/01	09/28/01	KWG0106136	
N-Nitrosodiphenylamine	ND	U	0.21	1	09/24/01	09/28/01	KWG0106136	
4-Bromophenyl Phenyl Ether	ND	U	0.21	1	09/24/01	09/28/01	KWG0106136	
Hexachlorobenzene	ND	U	0.21	1	09/24/01	09/28/01	KWG0106136	
Pentachlorophenol	ND	U	2.1	1	09/24/01	09/28/01	KWG0106136	
Phenanthrene	ND	U	0.21	1	09/24/01	09/28/01	KWG0106136	
Anthracene	ND	U	0.21	1	09/24/01	09/28/01	KWG0106136	
Di-n-butyl Phthalate	ND	U	0.21	1	09/24/01	09/28/01	KWG0106136	
Fluoranthene	ND	U	0.21	1	09/24/01	09/28/01	KWG0106136	
Pyrene	ND	U	0.21	1	09/24/01	09/28/01	KWG0106136	
Butyl Benzyl Phthalate	ND	U	0.21	1	09/24/01	09/28/01	KWG0106136	
3,3'-Dichlorobenzidine	ND	U	2.1	1	09/24/01	09/28/01	KWG0106136	
Benz(a)anthracene	ND	U	0.21	1	09/24/01	09/28/01	KWG0106136	
Chrysene	ND	U	0.21	1	09/24/01	09/28/01	KWG0106136	
Bis(2-ethylhexyl) Phthalate	ND	U	2.1	1	09/24/01	09/28/01	KWG0106136	
Di-n-octyl Phthalate	ND	U	0.21	1	09/24/01	09/28/01	KWG0106136	
Benzo(b)fluoranthene	ND	U	0.21	1	09/24/01	09/28/01	KWG0106136	
Benzo(k)fluoranthene	ND	U	0.21	1	09/24/01	09/28/01	KWG0106136	
Benzo(a)pyrene	ND	U	0.21	1	09/24/01	09/28/01	KWG0106136	
Indeno(1,2,3-cd)pyrene	ND	U	0.21	1	09/24/01	09/28/01	KWG0106136	
Dibenz(a,h)anthracene	ND	U	0.21	1	09/24/01	09/28/01	KWG0106136	
Benzo(g,h,i)perylene	ND	U	0.21	1	09/24/01	09/28/01	KWG0106136	

Comments:

00037

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	Arrowhead Engineering	**Service Request:**	K2106919
Project:	WR Grace-KDC Well Sampling	**Date Collected:**	09/18/2001
Sample Matrix:	Water	**Date Received:**	09/21/2001

Semi-Volatile Organic Compounds by GC/MS

Sample Name:	MW-2	**Units:**	ug/L
Lab Code:	K2106919-002	**Basis:**	NA

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
2-Fluorophenol	60	21-110	09/28/01	Acceptable
Phenol-d6	69	10-110	09/28/01	Acceptable
Nitrobenzene-d5	81	35-114	09/28/01	Acceptable
2-Fluorobiphenyl	66	43-116	09/28/01	Acceptable
2,4,6-Tribromophenol	90	10-123	09/28/01	Acceptable
Terphenyl-d14	79	30-120	09/28/01	Acceptable

Analyte Comments

4-Methylphenol	This analyte cannot be separated from 3-Methylphenol.

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	Arrowhead Engineering	**Service Request:**	K2106919
Project:	WR Grace-KDC Well Sampling	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

Semi-Volatile Organic Compounds by GC/MS

Sample Name:	Method Blank	**Units:**	ug/L
Lab Code:	KWG0106136-4	**Basis:**	NA
Extraction Method:	EPA 3520C	**Level:**	Low
Analysis Method:	8270C		

Analyte Name	Result	Q	MRL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Bis(2-chloroethyl) Ether	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
Phenol	ND	U	0.50	1	09/24/01	09/28/01	KWG0106136	
2-Chlorophenol	ND	U	0.50	1	09/24/01	09/28/01	KWG0106136	
1,3-Dichlorobenzene	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
1,4-Dichlorobenzene	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
1,2-Dichlorobenzene	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
Benzyl Alcohol	ND	U	5.0	1	09/24/01	09/28/01	KWG0106136	
Bis(2-chloroisopropyl) Ether	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
2-Methylphenol	ND	U	0.50	1	09/24/01	09/28/01	KWG0106136	
Hexachloroethane	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
N-Nitrosodi-n-propylamine	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
4-Methylphenol†	ND	U	0.50	1	09/24/01	09/28/01	KWG0106136	
Nitrobenzene	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
Isophorone	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
2-Nitrophenol	ND	U	0.50	1	09/24/01	09/28/01	KWG0106136	
2,4-Dimethylphenol	ND	U	2.0	1	09/24/01	09/28/01	KWG0106136	
Bis(2-chloroethoxy)methane	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
2,4-Dichlorophenol	ND	U	0.50	1	09/24/01	09/28/01	KWG0106136	
Benzoic Acid	ND	U	5.0	1	09/24/01	09/28/01	KWG0106136	
1,2,4-Trichlorobenzene	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
Naphthalene	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
4-Chloroaniline	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
Hexachlorobutadiene	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
4-Chloro-3-methylphenol	ND	U	1.0	1	09/24/01	09/28/01	KWG0106136	
2-Methylnaphthalene	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
Hexachlorocyclopentadiene	ND	U	1.0	1	09/24/01	09/28/01	KWG0106136	
2,4,6-Trichlorophenol	ND	U	0.50	1	09/24/01	09/28/01	KWG0106136	
2,4,5-Trichlorophenol	ND	U	0.50	1	09/24/01	09/28/01	KWG0106136	
2-Chloronaphthalene	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
2-Nitroaniline	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
Acenaphthylene	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
Dimethyl Phthalate	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
2,6-Dinitrotoluene	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
Acenaphthene	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
3-Nitroaniline	ND	U	1.0	1	09/24/01	09/28/01	KWG0106136	

Comments:

Client: Arrowhead Engineering
Project: WR Grace-KDC Well Sampling
Sample Matrix: Water

Service Request: K2106919
Date Collected: NA
Date Received: NA

Semi-Volatile Organic Compounds by GC/MS

Sample Name: Method Blank
Lab Code: KWG0106136-4

Units: ug/L
Basis: NA

Extraction Method: EPA 3520C
Analysis Method: 8270C

Level: Low

Analyte Name	Result	Q	MRL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
2,4-Dinitrophenol	ND	U	4.0	1	09/24/01	09/28/01	KWG0106136	
Dibenzofuran	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
4-Nitrophenol	ND	U	2.0	1	09/24/01	09/28/01	KWG0106136	
2,4-Dinitrotoluene	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
Fluorene	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
4-Chlorophenyl Phenyl Ether	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
Diethyl Phthalate	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
4-Nitroaniline	ND	U	1.0	1	09/24/01	09/28/01	KWG0106136	
2-Methyl-4,6-dinitrophenol	ND	U	2.0	1	09/24/01	09/28/01	KWG0106136	
N-Nitrosodiphenylamine	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
4-Bromophenyl Phenyl Ether	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
Hexachlorobenzene	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
Pentachlorophenol	ND	U	2.0	1	09/24/01	09/28/01	KWG0106136	
Phenanthrene	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
Anthracene	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
Di-n-butyl Phthalate	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
Fluoranthene	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
Pyrene	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
Butyl Benzyl Phthalate	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
3,3'-Dichlorobenzidine	ND	U	2.0	1	09/24/01	09/28/01	KWG0106136	
Benz(a)anthracene	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
Chrysene	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
Bis(2-ethylhexyl) Phthalate	ND	U	2.0	1	09/24/01	09/28/01	KWG0106136	
Di-n-octyl Phthalate	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
Benzo(b)fluoranthene	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
Benzo(k)fluoranthene	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
Benzo(a)pyrene	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
Indeno(1,2,3-cd)pyrene	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
Dibenz(a,h)anthracene	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	
Benzo(g,h,i)perylene	ND	U	0.20	1	09/24/01	09/28/01	KWG0106136	

Comments:

00040

Client: Arrowhead Engineering
Project: WR Grace-KDC Well Sampling
Sample Matrix: Water

Service Request: K2106919
Date Collected: NA
Date Received: NA

Semi-Volatile Organic Compounds by GC/MS

Sample Name: Method Blank
Lab Code: KWG0106136-4

Units: ug/L
Basis: NA

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
2-Fluorophenol	74	21-110	09/28/01	Acceptable
Phenol-d6	79	10-110	09/28/01	Acceptable
Nitrobenzene-d5	81	35-114	09/28/01	Acceptable
2-Fluorobiphenyl	74	43-116	09/28/01	Acceptable
2,4,6-Tribromophenol	84	10-123	09/28/01	Acceptable
Terphenyl-d14	122	30-120	09/28/01	Outside Control Limits

Analyte Comments

4-Methylphenol	This analyte cannot be separated from 3-Methylphenol.

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Arrowhead Engineering
Project: WR Grace-KDC Well Sampling
Sample Matrix: Water

Service Request: K2106919

Surrogate Recovery Summary
Semi-Volatile Organic Compounds by GC/MS

Extraction Method: EPA 3520C
Analysis Method: 8270C

Units: PERCENT
Level: Low

Sample Name	Lab Code	Sur1	Sur2	Sur3	Sur4	Sur5	Sur6	
MW-1	K2106919-001	72	73	74	71	107	117	
MW-2	K2106919-002	60	69	81	66	90	79	
Method Blank	KWG0106136-4	74	79	81	74	84	122	*
MW-1MS	KWG0106136-1	88	90	87	80	102	118	
MW-1DMS	KWG0106136-2	74	75	75	72	97	107	
Lab Control Sample	KWG0106136-3	76	85	88	84	90	95	

Surrogate Recovery Control Limits (%)

Sur1 = 2-Fluorophenol	21-110	Sur5 = 2,4,6-Tribromophenol	10-123
Sur2 = Phenol-d6	10-110	Sur6 = Terphenyl-d14	30-120
Sur3 = Nitrobenzene-d5	35-114		
Sur4 = 2-Fluorobiphenyl	43-116		

Results flagged with an asterisk (*) indicate values outside control criteria.
Results flagged with a pound (#) indicate the control criteria is not applicable.

00042

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	Arrowhead Engineering	**Service Request:**	K2106919
Project:	WR Grace-KDC Well Sampling	**Date Extracted:**	09/24/2001
Sample Matrix:	Water	**Date Analyzed:**	09/28/2001

Matrix Spike/Duplicate Matrix Spike Summary
Semi-Volatile Organic Compounds by GC/MS

Sample Name:	MW-1	**Units:**	ug/L
Lab Code:	K2106919-001	**Basis:**	NA
Extraction Method:	EPA 3520C	**Level:**	Low
Analysis Method:	8270C	**Extraction Lot:**	KWG0106136

		MW-1MS KWG0106136-1 Matrix Spike			MW-1DMS KWG0106136-2 Duplicate Matrix Spike					
Analyte Name	**Sample Result**	**Result**	**Expected**	**%Rec**	**Result**	**Expected**	**%Rec**	**%Rec Limits**	**RPD**	**RPD Limit**
Phenol	ND	8.83	10.0	88	7.72	10.0	77	10-121	13	30
2-Chlorophenol	ND	8.45	10.0	85	7.51	10.0	75	10-119	12	30
1,4-Dichlorobenzene	ND	5.59	10.0	56	4.85	10.0	48	15-78	14	30
N-Nitrosodi-n-propylamine	ND	8.48	10.0	85	7.53	10.0	75	30-159	12	30
1,2,4-Trichlorobenzene	ND	6.28	10.0	63	5.38	10.0	54	18-77	15	30
4-Chloro-3-methylphenol	ND	6.40	10.0	64	6.08	10.0	61	10-115	5	30
Acenaphthene	ND	8.18	10.0	82	8.03	10.0	80	25-130	2	30
4-Nitrophenol	ND	13.9	10.0	139	13.4	10.0	134	10-228	4	30
2,4-Dinitrotoluene	ND	11.2	10.0	112	11.2	10.0	112	15-149	0	30
Pentachlorophenol	ND	9.49	10.0	95	8.65	10.0	87	10-147	9	30
Pyrene	ND	10.8	10.0	108	10.6	10.0	106	32-163	2	30

Results flagged with an asterisk (*) indicate values outside control criteria.
Results flagged with a pound (#) indicate the control criteria is not applicable.
Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Client: Arrowhead Engineering
Project: WR Grace-KDC Well Sampling
Sample Matrix: Water

Service Request: K2106919
Date Extracted: 09/24/2001
Date Analyzed: 09/28/2001

Lab Control Spike Summary
Semi-Volatile Organic Compounds by GC/MS

Extraction Method: EPA 3520C
Analysis Method: 8270C

Units: ug/L
Basis: NA
Level: Low
Extraction Lot: KWG0106136

	Lab Control Sample KWG0106136-3 Lab Control Spike				
Analyte Name	**Result**	**Expected**	**%Rec**		**%Rec Limits**
Bis(2-chloroethyl) Ether	4.67	5.00	93		40-140
Phenol	4.03	5.00	81		38-110
2-Chlorophenol	3.85	5.00	77		43-109
1,3-Dichlorobenzene	2.38	5.00	48		40-140
1,4-Dichlorobenzene	2.43	5.00	49		18-88
1,2-Dichlorobenzene	2.75	5.00	55		40-140
Benzyl Alcohol	4.30	5.00	86		25-140
Bis(2-chloroisopropyl) Ether	4.26	5.00	85		40-140
2-Methylphenol	3.73	5.00	75		25-140
Hexachloroethane	1.97	5.00	39	*	40-140
N-Nitrosodi-n-propylamine	4.25	5.00	85		39-126
4-Methylphenol	3.42	5.00	68		40-140
Nitrobenzene	4.22	5.00	84		40-140
Isophorone	3.80	5.00	76		40-140
2-Nitrophenol	3.73	5.00	75		10-140
2,4-Dimethylphenol	2.08	5.00	42		25-140
Bis(2-chloroethoxy)methane	4.07	5.00	81		40-140
2,4-Dichlorophenol	3.21	5.00	64		25-140
Benzoic Acid	0.633	15.0	4	*	40-140
1,2,4-Trichlorobenzene	2.77	5.00	55		18-84
Naphthalene	3.59	5.00	72		40-140
4-Chloroaniline	3.14	5.00	63		10-140
Hexachlorobutadiene	1.50	5.00	30	*	40-140
4-Chloro-3-methylphenol	2.75	5.00	55		30-106
2-Methylnaphthalene	2.61	5.00	52		40-140
Hexachlorocyclopentadiene	1.46	5.00	29		25-140
2,4,6-Trichlorophenol	4.02	5.00	80		25-140
2,4,5-Trichlorophenol	3.95	5.00	79		25-140
2-Chloronaphthalene	3.80	5.00	76		40-140
2-Nitroaniline	5.07	5.00	101		10-140
Acenaphthylene	4.39	5.00	88		40-140
Dimethyl Phthalate	4.78	5.00	96		40-140
2,6-Dinitrotoluene	4.90	5.00	98		40-140
Acenaphthene	3.89	5.00	78		28-111
3-Nitroaniline	5.00	5.00	100		10-140
2,4-Dinitrophenol	2.68	5.00	54		10-140

Results flagged with an asterisk (*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

00044

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Arrowhead Engineering
Project: WR Grace-KDC Well Sampling
Sample Matrix: Water

Service Request: K2106919
Date Extracted: 09/24/2001
Date Analyzed: 09/28/2001

Lab Control Spike Summary
Semi-Volatile Organic Compounds by GC/MS

Extraction Method: EPA 3520C
Analysis Method: 8270C

Units: ug/L
Basis: NA
Level: Low
Extraction Lot: KWG0106136

Analyte Name	Lab Control Sample KWG0106136-3 Lab Control Spike Result	Expected	%Rec	%Rec Limits
Dibenzofuran	4.02	5.00	80	40-140
4-Nitrophenol	5.52	5.00	110	10-156
2,4-Dinitrotoluene	5.12	5.00	102	31-147
Fluorene	4.18	5.00	84	40-140
4-Chlorophenyl Phenyl Ether	4.06	5.00	81	40-140
Diethyl Phthalate	4.92	5.00	98	40-140
4-Nitroaniline	5.32	5.00	106	10-140
2-Methyl-4,6-dinitrophenol	4.00	5.00	80	25-140
N-Nitrosodiphenylamine	5.08	5.00	102	40-140
4-Bromophenyl Phenyl Ether	4.02	5.00	80	40-140
Hexachlorobenzene	3.83	5.00	77	40-140
Pentachlorophenol	2.43	5.00	49	23-117
Phenanthrene	4.23	5.00	85	40-140
Anthracene	4.39	5.00	88	40-140
Di-n-butyl Phthalate	5.42	5.00	108	40-140
Fluoranthene	4.74	5.00	95	40-140
Pyrene	4.34	5.00	87	32-152
Butyl Benzyl Phthalate	4.61	5.00	92	40-140
3,3'-Dichlorobenzidine	4.11	5.00	82	10-140
Benz(a)anthracene	4.47	5.00	89	40-140
Chrysene	4.31	5.00	86	40-140
Bis(2-ethylhexyl) Phthalate	4.97	5.00	99	40-140
Di-n-octyl Phthalate	4.89	5.00	98	40-140
Benzo(b)fluoranthene	4.48	5.00	90	40-140
Benzo(k)fluoranthene	4.44	5.00	89	40-140
Benzo(a)pyrene	4.56	5.00	91	40-140
Indeno(1,2,3-cd)pyrene	4.96	5.00	99	40-140
Dibenz(a,h)anthracene	4.88	5.00	98	40-140
Benzo(g,h,i)perylene	4.79	5.00	96	40-140

Results flagged with an asterisk (*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ASBESTOS

Lab/Cor, Inc.

A Professional Service Corporation in the Northwest

Report Number: 011068 *Report Date:* October 2, 2001

Client Information	
Project Name:	Not Available
Project No.:	K2106919
P. O. No.:	K2106919
Sample Type:	Water

Tracking Information			
Login:	Sep 22, 2001	*By:*	DJ
Prep:	Sep 24, 2001	*By:*	MH
Verified:	Sep 24, 2001	*By:*	MH
Reviewed:	Oct 2, 2001	*By:*	DW

Analysis Information	
Analysis Type:	EPA-Water
Reference No.:	100.2
Min. Aspect Ratio:	3:1
Min. Length:	10 µm
Min. Width:	NA

PRELIMINARY TABLE

Transmission Electron Microscopy – EPA-Water – Water Sample Analysis

Lab/Cor Sample No.	Client Sample No.	Description	Fiber Type	Concentration (MFL > 10 µm)**	95% Confidence Interval (MFL > 10 µm)	Struc. Count	Analytical Sens. (MFL > 10 µm)	Volume (ml)	Number of Grid Openings	Filter Area (mm²)	Area Analyzed (mm²)	Analyst	Analysis Date
011068-01	MW-1	Grace - KDC Well Sampling	AMPHIBOLE CHRYSOTILE	0.832 <0.083	0.399 - 1.530 0 - 0.307	10 0	0.083	40.0	4	193	0.0580	DW	9/25/01
			TOTAL	0.832	0.399 - 1.530	10							
011068-02	MW-2	Grace - KDC Well Sampling	AMPHIBOLE CHRYSOTILE	<6.658 <6.658	0 - 24.567 0 - 24.567	0 0	6.658	0.1	20	193	0.2899	DW	10/2/01
			TOTAL	<6.658	0 - 24.567	0							

**MFL > 10µm – Million Fibers per Liter Greater Than 10 µm in Length. Samples with values higher than seven(7) MFL are above the EPA maximum contaminant level (MCL) and must be reported to the appropriate state agency for an assessment of vulnerability.

ATTACHMENT 3

DATA SUMMARY TABLES

MW-1 AND MW-2

KDC Ground Water Quality Monitoring
Data Summary for Purgeable Organics by GC/MS (Method 8260)
Monitoring Well - MW-1

C.A.S #	Target Compounds	Results by Date 18-Sep-2001
67-64-1	acetone	<20
107-02-8	acrolein	--
107-13-1	acrylonitrile	--
71-43-2	benzene	<0.5 ppb
108-86-1	bromobenzene	<2.0 ppb
74-97-5	bromochloromethane	<0.5 ppb
75-27-4	bromodichloromethane	<0.5 ppb
75-25-2	bromoform	<0.5 ppb
74-83-9	bromomethane	<0.5 ppb
104-51-8	n-butylbenzene	<2.0 ppb
135-98-8	sec-butylbenzene	<2.0 ppb
98-06-6	tert-butylbenzene	<2.0 ppb
75-15-0	carbon disulfide	<0.5 ppb
56-23-5	carbon tetrachloride	<0.5 ppb
108-90-7	chlorobenzene	<0.5 ppb
124-48-1	dibromochloromethane	<0.5 ppb
75-00-3	chloroethane	<0.5 ppb
110-75-8	2-chloroethylvinyl ether	--
67-66-3	chloroform	<0.5 ppb
74-87-3	chloromethane	<0.5 ppb
95-49-8	2-chlorotoluene	<2.0 ppb
106-43-4	4-chlorotoluene	<2.0 ppb
96-12-8	1,2-dibromo-3-chloropropane	<2.0 ppb
106-93-4	1,2-dibromoethane	<2 ppb
74-95-3	dibromomethane	<0.5 ppb
95-50-1	1,2-dichlorobenzene	<0.5 ppb
541-73-1	1,3-dichlorobenzene	<0.5 ppb
106-46-7	1,4-dichlorobenzene	<0.5 ppb
75-71-8	dichlorodifluoromethane	<0.5 ppb
75-34-3	1,1-dichloroethane	<0.5 ppb
75-35-4	1,1-dichloroethene	<0.5 ppb
107-06-2	1,2-dichloroethane	<0.5 ppb
156-59-2	cis-1,2-dichloroethene	<0.5 ppb
156-60-5	trans-1,2-dichloroethene	<0.5 ppb
78-87-5	1,2-dichloropropane	<0.5 ppb
142-28-9	1,3-dichloropropane	<0.5 ppb
594-20-7	2,2-dichloropropane	<0.5 ppb
563-58-6	1,1-dichloropropene	<0.5 ppb
10061-01-5	cis-1,3-dichloropropene	<0.5 ppb
10061-02-6	trans-1,3-dichloropropene	<0.5 ppb
100-41-4	ethylbenzene	<0.5 ppb
87-68-3	hexachlorobutadiene	<2.0 ppb
591-78-6	2-hexanone	<20 ppb
74-88-4	iodomethane	--

KDC Ground Water Quality Monitoring
Data Summary for Purgeable Organics by GC/MS (Method 8260)
Monitoring Well - MW-1

C.A.S #	Target Compounds	Results by Date 18-Sep-2001
98-82-8	isopropylbenzene	<2.0 ppb
99-87-6	p-isopropyltoluene	<2.0 ppb
1634-04-4	methyl tert-butyl ether (MTBE)	--
78-93-3	2-butanone (MEK)	<20 ppb
108-10-1	methyl isobutyl ketone (MIBK)	<20 ppb
75-09-2	methylene chloride	<1.0 ppb
91-20-3	naphthalene	<2.0 ppb
103-65-1	n-propylbenzene	<2.0 ppb
100-42-5	styrene	<0.5 ppb
127-18-4	tetrachloroethene	<0.5 ppb
108-88-3	toluene	<0.5 ppb
630-20-6	1,1,1,2-tetrachloroethane	<0.5 ppb
79-34-5	1,1,2,2-tetrachloroethane	<0.5 ppb
87-61-6	1,2,3-trichlorobenzene	<2.0 ppb
120-82-1	1,2,4-trichlorobenzene	<2.0 ppb
71-55-6	1,1,1-trichloroethane	--
79-00-5	1,1,2-trichloroethane	<0.5 ppb
79-01-6	trichloroethene	<0.5 ppb
75-69-4	trichlorofluoromethane	**0.60**
96-18-4	1,2,3-trichloropropane	<0.5 ppb
95-63-6	1,2,4-trimethylbenzene	<2.0 ppb
108-67-8	1,3,5-trimethylbenzene	<2.0 ppb
108-05-4	vinyl acetate	--
75-01-4	vinyl chloride	<0.5 ppb
106423/108383	p/m-xylene	<0.5 ppb
95-47-6	o-xylene	<0.5 ppb

-- The target analyte concentration was not determined for this sample

KDC Ground Water Quality Monitoring
Data Summary for Semivolatile Organics (Method 8270)
Monitoring Well - MW-1

C.A.S #	Parameter	Results by Date 18-Sep-01
83-32-9	acenaphthene	<0.20 ppb
208-96-8	acenaphthylene	<0.20 ppb
120-12-7	anthracene	<0.20 ppb
103-33-3	azobenzene	--
92-87-5	benzidine	--
	benzyl alcohol	<4.9 ppb
56-55-3	benzo(a)anthracene	<0.20 ppb
205-99-2	benzo(b)fluoranthene	<0.20 ppb
207-08-9	benzo(k)fluoranthene	<0.20 ppb
191-24-2	benzo(g,h,i)perylene	<0.20 ppb
50-32-8	benzo(a)pyrene	<0.20 ppb
	benzoic acid	<4.9 ppb
101-55-3	4-bromophenyl phenyl ether	<0.20 ppb
85-88-7	butyl benzyl phthalate	<0.20 ppb
59-50-7	4-chloro-3-methylphenol	<0.96 ppb
111-91-1	bis(2-chloroethoxy)methane	<0.20 ppb
111-44-4	bis(2-chloroethyl)ether	<0.20 ppb
108-60-1	bis(2-chloroisopropyl)ether	<0.20 ppb
91-58-7	2-chloronaphthalene	<0.20 ppb
95-57-8	2-chlorophenol	<0.49 ppb
106-48-9	4-chlorophenol	--
	4-chloroaniline	<0.20 ppb
7005-72-3	4-chlorophenyl phenyl ether	<0.20 ppb
218-01-9	chrysene	<0.20 ppb
53-70-3	dibenz(a,h)anthracene	<0.20 ppb
	dibenzofuran	<0.20 ppb
95-50-1	1,2 dichlorobenzene	<0.20 ppb
541-73-1	1,3 dichlorobenzene	<0.20 ppb
106-46-7	1,4 dichlorobenzene	<0.20 ppb
91-94-1	3,3'-dichlorobenzidine	<2.0 ppb
120-83-2	2,4-dichlorophenol	<0.49 ppb
84-66-2	diethyl phthalate	<0.20 ppb
131-11-3	dimethyl phthalate	<0.20 ppb
105-67-9	2,4-dimethylphenol	<2.1 ppb
84-74-2	di-n-butyl phthalate	<0.20 ppb
534-52-1	4,6-dinitro-2-methylphenol	<2.0 ppb
51-28-5	2,4-dinitrophenol	<3.9 ppb
121-14-2	2,4-dinitrotoluene	<0.20 ppb
606-20-2	2,6-dinitrotoluene	<0.20 ppb
117-84-0	di-n-octyl phthalate	<0.20 ppb
117-81-7	bis(2-ethylhexyl)phthalate	<2.0 ppb
206-44-0	fluoranthene	<0.20 ppb
86-73-7	fluorene	<0.20 ppb
118-74-1	hexachlorobenzene	<0.20 ppb
87-68-3	hexachlorobutadiene	<0.20 ppb

KDC Ground Water Quality Monitoring
Data Summary for Semivolatile Organics (Method 8270)
Monitoring Well - MW-1

C.A.S #	Parameter	Results by Date 18-Sep-01
77-47-4	hexachlorocyclopentadiene	<0.97 ppb
67-72-1	hexachloroethane	<0.20 ppb
193-39-5	indeno(1,2,3-c,d)pyrene	<0.20 ppb
78-59-1	isophorone	<0.20 ppb
90-12-0	1-methylnaphthalene	--
91-57-6	2-methylnaphthalene	<0.20 ppb
95-48-7	2-methylphenol (o-cresol)	<0.49 ppb
106445	4-methylphenol (p-cresol)	<0.49 ppb
91-20-3	naphthalene	<0.20 ppb
	2-nitroaniline	<0.20 ppb
	3-nitroaniline	<0.97 ppb
	4-nitroaniline	<0.97 ppb
98-95-3	nitrobenzene	<0.20 ppb
88-75-5	2-nitrophenol	<0.49 ppb
100-02-7	4-nitrophenol	<2.0 ppb
62-75-9	n-nitrosodimethylamine	--
621-64-7	n-nitrosodi-n-propylamine	<0.20 ppb
86-30-6	n-nitrosodiphenylamine	<0.20 ppb
87-86-5	pentachlorophenol	<1.9 ppb
85-01-8	phenanthrene	<0.20 ppb
108-95-2	phenol	<0.52
129-00-0	pyrene	<0.20 ppb
110-86-1	pyridine	--
120-82-1	1,2,4-trichlorobenzene	<0.20 ppb
95-95-4	2,4,5-trichlorophenol	<0.49 ppb
88-06-2	2,4,6-trichlorophenol	<0.49 ppb

KDC Ground Water Quality Monitoring
Data Summary for Metals Analysis (200 series)
Monitoring Well - MW-1

Target Compounds	Results by Date 18-Sep-2001
antimony, total	0.00011 mg/l
arsenic, total	<0.0005 mg/l
barium, total	0.0942 mg/l
beryllium, total	<0.00002 mg/l
cadmium, total	<0.00005 mg/l
chromium, total	0.007 mg/l
copper, total	0.003 mg/l
iron, total	0.126 mg/l
lead, total	0.00019 mg/l
manganese, total	0.00338 mg/l
mercury, total	--
nickel, total	<0.020 mg/l
selenium, total	<0.004 mg/l
silver, total	<0.00002 mg/l
thallium, total	<0.00002 mg/l
zinc, total	<0.010 mg/l

-- The target analyte concentration was not determined for this sample.

KDC Ground Water Quality Monitoring
Data Summary for PCB Screening Analysis (Methods 8082 508A)
Monitoring Well - MW-1

C.A.S #	Target Compounds	Results by Date 18-Sep-2001
12674-11-2	Aroclor-1016	<0.20 ppb
11104-28-2	Aroclor-1221	<0.40 ppb
1114-16-5	Aroclor-1232	<0.20 ppb
53469-21-9	Aroclor-1242	<0.20 ppb
12672-29-6	Aroclor-1248	<0.20 ppb
11097-69-1	Aroclor-1254	<0.20 ppb
11096-82-5	Aroclor-1260	<0.20 ppb
37324-23-5	Aroclor-1262	--
11100-14-4	Aroclor-1268	--
2051-24-3	Dechlorobiphenyl	--

-- The target analyte concentration was not determined for this sample.

KDC Ground Water Quality Monitoring
Data Summary for Asbestos in Water Analysis (Method 100.2)
Monitoring Well - MW-1

Target Compounds	**Results by Date** 18-Sep-2001
Asbestos in Water	**0.832** mfl

mfl - million fibers per liter

KDC Ground Water Quality Monitoring
Data Summary for Purgeable Organics by GC/MS (Method 8260)
Monitoring Well - MW-2

C.A.S #	Target Compounds	Results by Date 5-Oct-2000	9-Apr-2001	18-Sep-2001
67-64-1	acetone	--	<50 ppb	<20
107-02-8	acrolein	--	<20 ppb	--
107-13-1	acrylonitrile	--	<20 ppb	--
71-43-2	benzene	<1 ppb	<1 ppb	<0.5 ppb
108-86-1	bromobenzene	<1 ppb	<1 ppb	<2.0 ppb
74-97-5	bromochloromethane	<1 ppb	<1 ppb	<0.5 ppb
75-27-4	bromodichloromethane	<1 ppb	<1 ppb	<0.5 ppb
75-25-2	bromoform	<1 ppb	<1 ppb	<0.5 ppb
74-83-9	bromomethane	<1 ppb	<1 ppb	<0.5 ppb
104-51-8	n-butylbenzene	--	<1 ppb	<2.0 ppb
135-98-8	sec-butylbenzene	--	<1 ppb	<2.0 ppb
98-06-6	tert-butylbenzene	--	<1 ppb	<2.0 ppb
75-15-0	carbon disulfide	--	<1 ppb	<0.5 ppb
56-23-5	carbon tetrachloride	<1 ppb	<1 ppb	<0.5 ppb
108-90-7	chlorobenzene	<1 ppb	<1 ppb	<0.5 ppb
124-48-1	dibromochloromethane	<1 ppb	<1 ppb	<0.5 ppb
75-00-3	chloroethane	<1 ppb	<1 ppb	<0.5 ppb
110-75-8	2-chloroethylvinyl ether	<1 ppb	<1 ppb	--
67-66-3	chloroform	<1 ppb	<1 ppb	<0.5 ppb
74-87-3	chloromethane	<1 ppb	<1 ppb	<0.5 ppb
95-49-8	2-chlorotoluene	<1 ppb	<1 ppb	<2.0 ppb
106-43-4	4-chlorotoluene	<1 ppb	<1 ppb	<2.0 ppb
96-12-8	1,2-dibromo-3-chloropropane	--	<1 ppb	<2.0 ppb
106-93-4	1,2-dibromoethane	<1 ppb	<1 ppb	<2 ppb
74-95-3	dibromomethane	<1 ppb	<1 ppb	<0.5 ppb
95-50-1	1,2-dichlorobenzene	<1 ppb	<1 ppb	<0.5 ppb
541-73-1	1,3-dichlorobenzene	<1 ppb	<1 ppb	<0.5 ppb
106-46-7	1,4-dichlorobenzene	<1 ppb	<1 ppb	<0.5 ppb
75-71-8	dichlorodifluoromethane	<1 ppb	<1 ppb	<0.5 ppb
75-34-3	1,1-dichloroethane	<1 ppb	<1 ppb	<0.5 ppb
75-35-4	1,1-dichloroethene	<1 ppb	<1 ppb	<0.5 ppb
107-06-2	1,2-dichloroethane	<1 ppb	<1 ppb	<0.5 ppb
156-59-2	cis-1,2-dichloroethene	<1 ppb	<1 ppb	<0.5 ppb
156-60-5	trans-1,2-dichloroethene	<1 ppb	<1 ppb	<0.5 ppb
78-87-5	1,2-dichloropropane	<1 ppb	<1 ppb	<0.5 ppb
142-28-9	1,3-dichloropropane	<1 ppb	<1 ppb	<0.5 ppb
594-20-7	2,2-dichloropropane	<1 ppb	<1 ppb	<0.5 ppb
563-58-6	1,1-dichloropropene	<1 ppb	<1 ppb	<0.5 ppb
10061-01-5	cis-1,3-dichloropropene	<1 ppb	<1 ppb	<0.5 ppb
10061-02-6	trans-1,3-dichloropropene	<1 ppb	<1 ppb	<0.5 ppb
100-41-4	ethylbenzene	<1 ppb	<1 ppb	<0.5 ppb
87-68-3	hexachlorobutadiene	--	<1 ppb	<2.0 ppb
591-78-6	2-hexanone	--	<20 ppb	<20 ppb
74-88-4	iodomethane	--	<1 ppb	--

KDC Ground Water Quality Monitoring
Data Summary for Purgeable Organics by GC/MS (Method 8260)
Monitoring Well - MW-2

C.A.S #	Target Compounds	Results by Date 5-Oct-2000	9-Apr-2001	18-Sep-2001
98-82-8	isopropylbenzene	--	<1 ppb	<2.0 ppb
99-87-6	p-isopropyltoluene	--	<1 ppb	<2.0 ppb
1634-04-4	methyl tert-butyl ether (MTBE)	<1 ppb	<1 ppb	--
78-93-3	2-butanone (MEK)	<20 ppb	<20 ppb	<20 ppb
108-10-1	methyl isobutyl ketone (MIBK)	--	<20 ppb	<20 ppb
75-09-2	methylene chloride	<1 ppb	3.8[b] ppb	<1.0 ppb
91-20-3	naphthalene	--	<1 ppb	<2.0 ppb
103-65-1	n-propylbenzene	--	<1 ppb	<2.0 ppb
100-42-5	styrene	<1 ppb	<1 ppb	<0.5 ppb
127-18-4	tetrachloroethene	<1 ppb	<1 ppb	<0.5 ppb
108-88-3	toluene	<1 ppb	<1 ppb	<0.5 ppb
630-20-6	1,1,1,2-tetrachloroethane	<1 ppb	<1 ppb	<0.5 ppb
79-34-5	1,1,2,2-tetrachloroethane	<1 ppb	<1 ppb	<0.5 ppb
87-61-6	1,2,3-trichlorobenzene	--	<1 ppb	<2.0 ppb
120-82-1	1,2,4-trichlorobenzene	--	<1 ppb	<2.0 ppb
71-55-6	1,1,1-trichloroethane	<1 ppb	<1 ppb	--
79-00-5	1,1,2-trichloroethane	<1 ppb	<1 ppb	<0.5 ppb
79-01-6	trichloroethene	<1 ppb	<1 ppb	<0.5 ppb
75-69-4	trichlorofluoromethane	<1 ppb	<1 ppb	<0.5 ppb
96-18-4	1,2,3-trichloropropane	<1 ppb	<1 ppb	<0.5 ppb
95-63-6	1,2,4-trimethylbenzene	--	<1 ppb	<2.0 ppb
108-67-8	1,3,5-trimethylbenzene	--	<1 ppb	<2.0 ppb
108-05-4	vinyl acetate	--	<1 ppb	--
75-01-4	vinyl chloride	<1 ppb	<1 ppb	<0.5 ppb
106423/108383	p/m-xylene	<1 ppb	<1 ppb	<0.5 ppb
95-47-6	o-xylene	<1 ppb	<1 ppb	<0.5 ppb

b This target analyte was found in the associated trip blank as well as the sample.

-- The target analyte concentration was not determined for this sample

KDC Ground Water Quality Monitoring
Data Summary for Semivolatile Organics (Method 8270)
Monitoring Well - MW-2

C.A.S #	Parameter	Results by Date 5-Oct-00	9-Apr-01	18-Sep-01
77-47-4	hexachlorocyclopentadiene	<20 ppb	<20 ppb	<1.1 ppb
67-72-1	hexachloroethane	<10 ppb	<10 ppb	<0.21 ppb
193-39-5	indeno(1,2,3-c,d)pyrene	<10 ppb	<10 ppb	<0.21 ppb
78-59-1	isophorone	<10 ppb	<10 ppb	<0.21 ppb
90-12-0	1-methylnaphthalene	<10 ppb	<10 ppb	--
91-57-6	2-methylnaphthalene	<10 ppb	<10 ppb	<0.21 ppb
95-48-7	2-methylphenol (o-cresol)	<10 ppb	<10 ppb	<0.52 ppb
106445	4-methylphenol (p-cresol)	<10 ppb	<10 ppb	<0.52 ppb
91-20-3	naphthalene	<10 ppb	<10 ppb	<0.21 ppb
	2-nitroaniline	--	--	<0.21 ppb
	3-nitroaniline	--	--	<1.1 ppb
	4-nitroaniline	--	--	<1.1 ppb
98-95-3	nitrobenzene	<10 ppb	<10 ppb	<0.21 ppb
88-75-5	2-nitrophenol	<10 ppb	<10 ppb	<0.52 ppb
100-02-7	4-nitrophenol	<50 ppb	<50 ppb	<2.1 ppb
62-75-9	n-nitrosodimethylamine	<10 ppb	<10 ppb	--
621-64-7	n-nitrosodi-n-propylamine	<10 ppb	<10 ppb	<0.21 ppb
86-30-6	n-nitrosodiphenylamine	<10 ppb	<10 ppb	<0.21 ppb
87-86-5	pentachlorophenol	<50 ppb	<50 ppb	<2.1 ppb
85-01-8	phenanthrene	<10 ppb	<10 ppb	<0.21 ppb
108-95-2	phenol	<10 ppb	<10 ppb	<0.52
129-00-0	pyrene	<10 ppb	<10 ppb	<0.21 ppb
110-86-1	pyridine	<20 ppb	<20 ppb	--
120-82-1	1,2,4-trichlorobenzene	<10 ppb	<10 ppb	<0.21 ppb
95-95-4	2,4,5-trichlorophenol	<10 ppb	<10 ppb	<0.52 ppb
88-06-2	2,4,6-trichlorophenol	<10 ppb	<10 ppb	<0.52 ppb

KDC Ground Water Quality Monitoring
Data Summary for Semivolatile Organics (Method 8270)
Monitoring Well - MW-2

C.A.S #	Parameter	Results by Date 5-Oct-00	9-Apr-01	18-Sep-01
83-32-9	acenaphthene	<10 ppb	<10 ppb	<0.21 ppb
208-96-8	acenaphthylene	<10 ppb	<10 ppb	<0.21 ppb
120-12-7	anthracene	<10 ppb	<10 ppb	<0.21 ppb
103-33-3	azobenzene	<10 ppb	<10 ppb	--
92-87-5	benzidine	<20 ppb	<20 ppb	--
	benzyl alcohol	--	--	<5.2 ppb
56-55-3	benzo(a)anthracene	<10 ppb	<10 ppb	<0.21 ppb
205-99-2	benzo(b)fluoranthene	<10 ppb	<10 ppb	<0.21 ppb
207-08-9	benzo(k)fluoranthene	<10 ppb	<10 ppb	<0.21 ppb
191-24-2	benzo(g,h,i)perylene	<10 ppb	<10 ppb	<0.21 ppb
50-32-8	benzo(a)pyrene	<10 ppb	<10 ppb	<0.21 ppb
	benzoic acid	--	--	<5.2 ppb
101-55-3	4-bromophenyl phenyl ether	<10 ppb	<10 ppb	<0.21 ppb
85-88-7	butyl benzyl phthalate	<10 ppb	<10 ppb	<0.21 ppb
59-50-7	4-chloro-3-methylphenol	<10 ppb	<10 ppb	<1.0 ppb
111-91-1	bis(2-chloroethoxy)methane	<10 ppb	<10 ppb	<0.21 ppb
111-44-4	bis(2-chloroethyl)ether	<10 ppb	<10 ppb	<0.21 ppb
108-60-1	bis(2-chloroisopropyl)ether	<10 ppb	<10 ppb	<0.21 ppb
91-58-7	2-chloronaphthalene	<10 ppb	<10 ppb	<0.21 ppb
95-57-8	2-chlorophenol	<10 ppb	<10 ppb	<0.52 ppb
106-48-9	4-chlorophenol	<10 ppb	<10 ppb	--
	4-chloroaniline	--	--	<0.21 ppb
7005-72-3	4-chlorophenyl phenyl ether	<10 ppb	<10 ppb	<0.21 ppb
218-01-9	chrysene	<10 ppb	<10 ppb	<0.21 ppb
53-70-3	dibenz(a,h)anthracene	<10 ppb	<10 ppb	<0.21 ppb
	dibenzofuran	--	--	<0.21 ppb
95-50-1	1,2 dichlorobenzene	<10 ppb	<10 ppb	<0.21 ppb
541-73-1	1,3 dichlorobenzene	<10 ppb	<10 ppb	<0.21 ppb
106-46-7	1,4 dichlorobenzene	<10 ppb	<10 ppb	<0.21 ppb
91-94-1	3,3'-dichlorobenzidine	<20 ppb	<20 ppb	<2.1 ppb
120-83-2	2,4-dichlorophenol	<10 ppb	<10 ppb	<0.52 ppb
84-66-2	diethyl phthalate	<10 ppb	<10 ppb	<0.21 ppb
131-11-3	dimethyl phthalate	<10 ppb	<10 ppb	<0.21 ppb
105-67-9	2,4-dimethylphenol	<10 ppb	<10 ppb	<2.1 ppb
84-74-2	di-n-butyl phthalate	<10 ppb	<10 ppb	<0.21 ppb
534-52-1	4,6-dinitro-2-methylphenol	<50 ppb	<50 ppb	<2.1 ppb
51-28-5	2,4-dinitrophenol	<50 ppb	<50 ppb	<4.2 ppb
121-14-2	2,4-dinitrotoluene	<10 ppb	<10 ppb	<0.21 ppb
606-20-2	2,6-dinitrotoluene	<10 ppb	<10 ppb	<0.21 ppb
117-84-0	di-n-octyl phthalate	<10 ppb	<10 ppb	<0.21 ppb
117-81-7	bis(2-ethylhexyl)phthalate	1.9J	<10 ppb	<2.1 ppb
206-44-0	fluoranthene	<10 ppb	<10 ppb	<0.21 ppb
86-73-7	fluorene	<10 ppb	<10 ppb	<0.21 ppb
118-74-1	hexachlorobenzene	<10 ppb	<10 ppb	<0.21 ppb
87-68-3	hexachlorobutadiene	<10 ppb	<10 ppb	<0.21 ppb

KDC Ground Water Quality Monitoring
Data Summary for Metals Analysis (200 series)
Monitoring Well - MW-2

Target Compounds	Results by Date 5-Oct-2000	9-Apr-2001	18-Sep-2001
antimony, total	--	<0.003 mg/l	<0.00025 mg/l
arsenic, total	0.023 mg/l	0.033 mg/l	0.0281 mg/l
barium, total	0.3 mg/l	0.628 mg/l	0.703 mg/l
beryllium, total	--	0.003 mg/l	0.00312 mg/l
cadmium, total	<0.001 mg/l	0.0013 mg/l	0.00057 mg/l
chromium, total	<0.01 mg/l	0.018 mg/l	0.0102 mg/l
copper, total	--	0.293 mg/l	0.374 mg/l
iron, total	--	51.8 mg/l	42.1 mg/l
lead, total	0.02 mg/l	0.043 mg/l	0.0448 mg/l
manganese, total	--	1.00 mg/l	0.916 mg/l
mercury, total	<0.001 mg/l	<0.0006 mg/l	--
nickel, total	--	0.03 mg/l	0.0365 mg/l
selenium, total	0.006 mg/l	0.004 mg/l	<0.010 mg/l
silver, total	<0.005 mg/l	<0.003 mg/l	0.00036 mg/l
thallium, total	--	<0.002 mg/l	0.00062 mg/l
zinc, total	--	0.20 mg/l	0.204 mg/l

-- The target analyte concentration was not determined for this sample.

KDC Ground Water Quality Monitoring
Data Summary for PCB Screening Analysis (Methods 8082 508A)
Monitoring Well - MW-2

C.A.S #	Target Compounds	Results by Date 5-Oct-2000	9-Apr-2001	18-Sep-2001
12674-11-2	Aroclor-1016	<1 ppb	--	<0.19 ppb
11104-28-2	Aroclor-1221	<2 ppb	--	<0.38 ppb
1114-16-5	Aroclor-1232	<1 ppb	--	<0.19 ppb
53469-21-9	Aroclor-1242	<1 ppb	--	<0.19 ppb
12672-29-6	Aroclor-1248	<1 ppb	--	<0.19 ppb
11097-69-1	Aroclor-1254	<1 ppb	--	<0.19 ppb
11096-82-5	Aroclor-1260	<1 ppb	--	<0.19 ppb
37324-23-5	Aroclor-1262	<1 ppb	--	--
11100-14-4	Aroclor-1268	<1 ppb	--	--
2051-24-3	Dechlorobiphenyl	--	<0.5 ppb	--

-- The target analyte concentration was not determined for this sample.

KDC Ground Water Quality Monitoring
Data Summary for Asbestos in Water Analysis (Method 100.2)
Monitoring Well - MW-2

	Results by Date		
Target Compounds	5-Oct-2000	9-Apr-2001	18-Sep-2001
Asbestos in Water	--	<74.8 mfl	<6.658 mfl

-- The target analyte concentration was not determined for this sample.

mfl - million fibers per liter

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ISR Num

Reference
Project No.
Project Name MR Grace-KDC Well Sampling

Report To David Cosgriff
Arrowhead Engineering

Site ID
Proj. Chemist Lynda Huckestein
Samples Rec'd 21-SEP-01
Report Date 19-OCT-01

Analysis	Matrix	Description	Qty	Unit Price	Total Price	
8082-AR	WATER	Aroclors by GC/ECD	2	$ 95.00	$ 190.00	K
8260	WATER	Volatile Organic Compounds by GC/MS	2	$ 195.00	$ 390.00	K
8270	WATER	SVOA Compounds by GC/MS	2	$ 325.00	$ 650.00	K
EDD-DOD	WATER	Electronic Data Deliverable on DOD forms	1	$ 0.00	$ 0.00	K
AS/GFAA	WATER	Arsenic by GFAA	2	$ 22.00	$ 44.00	K
PB/GFAA	WATER	Lead by GFAA	2	$ 22.00	$ 44.00	K
SE/GFAA	WATER	Selenium by GFAA	2	$ 22.00	$ 44.00	K
HG/CVAA	WATER	Mercury by CVAA	2	$ 30.00	$ 60.00	K
ICP/MS-11	WATER	Eleven ICP/MS Metals	2	$ 107.00	$ 214.00	K
MISC-OUT	WATER	Asbestos	2	$ 375.00	$ 750.00	L
TL/GFAA	WATER	Thallium by GFAA	2	$ 22.00	$ 44.00	K
~DIGEST	WATER	Sample Digestion	2	$ 10.00	$ 20.00	K

2 Samples; 23 Analyses; Total Amount Due: $ 2450.00

Client Id: MW-1, MW-2

MasterCard VISA [redacted]

Terms: Net 30 days, 1.5% interest per month (18% per year) charge on past due accounts.

Arrowhead Engineering, Inc

P O Box 843
1504 Kanisku Avenue
Libby, MT 59923

Invoice

DATE	INVOICE #
10/29/2001	2001-31-002

BILL TO
W.R. Grace Mr. Alan Stringer 317 Mineral Avenue Libby, MT 59923

Project Number	TERMS	DUE DATE	PROJECT	PO No.
2001-31	Due on receipt	10/29/2001	Monitoring wells - q...	Verbal - Stringer

DATE	DESCRIPTION	HOURS	RATE	AMOUNT
9/17/2001	Randy C. - collecting sampling gear and preparing for ground water sampling.	1.5	35.00	52.50
9/18/2001	Randy C. - Ground water sampling of MW-1 and MW-2 on the KDC property. Field work and preparing samples for shipment to laboratory.	6.5	35.00	227.50
9/14/2001	Met w/ Jim Stout to complete fit test for respirator for upcoming field work.	0.5	70.00	35.00
9/18/2001	Field work to collect ground water samples from MW-1 and MW-2 on the KDC property.	4.5	70.00	315.00
9/19/2001	Completed field data sheets and unloaded sampling equipment.	1	70.00	70.00
10/29/2001	Completed data entry into the database and prepared data summary report for W.R. Grace. Submitted report along with data to Alan Stringer.	2	70.00	140.00
10/29/2001	Other Subcontracted Services (Analytical Laboratory Analysis of Ground Water Samples - Columbia Analytical Services, Inc.) - includes 7.5% markup		2,633.75	2,633.75
10/29/2001	Telephone/Postage (2.9 % of AE Labor)		16.24	16.24

FAX to 10/30/01

Thank you for your business.

Total $3,489.99

OK TO PAY AS 10/30/01

DEPARTMENT OF ENVIRONMENTAL QUALITY

Inspection discussion

Date: 10/29/01 Time: _____ a.m. _____ p.m.

File No. / Name: KOOTENAI DEVELOPMENT COMPANY

Contact: ALAN STRUNDER

Address: _____

Phone: 293- 3964

RESULTS OF CONVERSATION OR DISCUSSION:

Talked to Alan about scheduly inspection.

Site is closed: snow, need 40 hr trainig, steel toe boots, hard hat, & respirator to access. next spring will be much easier. so we postponed to next spring

- Glory Hole done + sealed (he will send photos)
- water samples taken + he will send results
- he hasn't seen any mntng data
- hasn't done anything on corner tailings
  - waiting for Superfund decision

FOLLOW-UP ACTION REQUIRED? Yes_____ No X

Paul L Rly 10/29/01

DEQ Employee *Date*

TARGET SHEET

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